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M.Sc. (Psychology)

IV - Semester

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ENVIRONMENTAL PSYCHOLOGY

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Units (1-14)

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SYLLABI-BOOK MAPPING TABLE

Environmental Psychology

Syllabi	Mapping in Book
BLOCK I: CONCEPT OF ENVIRONMENTAL PSYCHOLOGY **Unit 1: Introduction** The nature and scope of environmental psychology – Role and functions of environmental psychologists – ways that environmental psychology has changed the world – understanding ordinary landscapes – psychological benefits of nature **Unit 2: Environmental Psychology** Introduction: Nature, scope, history and focus of environmental psychology; Scientific method; models and theories of environment behavior relationship. **Unit 3: Environmental Perception and Cognition** Environmental perception; spatial cognition; environmental values and attitudes, attachment and identity; appraisal and assessment, personal space, privacy and territoriality. **Unit 4: Environmental Stress and Health** Environmental stress, crowding, noise and overpopulation; effects of physical environment on health.	**Unit 1:** Introduction **(Pages 1-17);** **Unit 2:** History and Theories of Environmental Psychology **(Pages 18-35);** **Unit 3:** Environmental Perception and Cognition **(Pages 36-50);** **Unit 4:** Environmental Stress and Health **(Pages 51-59)**
BLOCK II: PROBLEMS ND SOLUTIONS **Unit 5: Weather and Climate Issues** Weather and climate, seasonality, natural and technological disasters, environmental risk perception. **Unit 6: Environmental Problems and Solutions** Psychology of environmental problems; sustainability, common dilemma, solution to environmental problems, sustainable design; designing more habitable environments.. **Unit 7: Theoretical Orientations** Social psychological perspective – Urie Bronfenbrenner – Baker's environmental psychology. **Unit 8: Spatio – Physical Dimensions of Behavior** Personal space – territoriality and crowding – urban environment and stress – noise, pollution, commuting.	**Unit 5:** Weather and Climate Issues **(Pages 60-76);** **Unit 6:** Environmental Problems and Solutions **(Pages 77-88);** **Unit 7:** Theoretical Orientations **(Pages 89-95);** **Unit 8:** Spatio – Physical Dimensions of Behavior **(Pages 96-104)**
BLOCK III: PERCEPTION AND PLANNING **Unit 9: Towards Better Environment** Planning – role of media – practitioners, NGO's contribution to changing behavior to save the environment. **Unit 10: Sustainability** Environmental degradation – resource overconsumption, pollution, climate change – human health and well being connected with environmental health – reciprocal relationship between human beings and natural world. **Unit 11: Public Reactions to Pollution** Environmental Perception, Cognition and Attitudes. Elementary Psychophysics. Perception : Theories of Environmental Perception. Environmental Cognition, Environmental Attitudes, Changing Attitudes.	**Unit 9:** Towards Better Environment **(Pages 105-110);** **Unit 10:** Sustainability **(Pages 111-124);** **Unit 11:** Public Reactions to Pollution **(Pages 125-140)**
BLOCK IV: BEHAVIOURS AND RESEARCH METHOD **Unit 12: Psychology of Stress and Researching Stress** The Environmental context. Moderators of stress response. The role of stress in understanding organism-environmental relationships **Unit 13: Behaviours Disturbing Environmental Stressors** Physical stressors : Ambient Temperature. Littering, Hummidity, Sunlight, Wind, Air and Water. Ion Concentration. The Atmospheric stressors : Carbon-dioxide, Carbon-Monoxide, Ozone. Tobacco smoke as a pollutant. Psychological Stressors : Noise :The Ubiquitous Pollutant : Noise in the work place. Noise in the living environment, noise in the laboratory Noise and social behavior : Individual Difference in response to Noise. Noise in schools and hospitals. Noise and Law. **Unit 14: Research Methods in Environmental Psychology** Evaluating the adequacy of environmental research.	**Unit 12:** Psychology of Stress and Researching Stress **(Pages 141-163);** **Unit 13:** Behaviours Disturbing Environmental Stressors **(Pages 164-187);** **Unit 14:** Research Methods in Environmental Psychology **(Pages 188-196)**

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INTRODUCTION

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Environmental psychology refers to the study of transactions between people and their physical settings. In these transactions, people change the environment, and their behaviour and experiences are changed by the environment. The field of environmental psychology is also known as human factors science, cognitive ergonomics, ecological psychology, ecopsychology, environment-behaviour studies, and person-environment studies.

The field of environmental psychology encompasses theory, research, and practice whose objective is to improve the relationship of humans with the natural environment and making buildings more humane. Fields related to the subject of environmental psychology include behavioural geography, environmental sociology, social ecology, and others.

This book, *Environmental Psychology*, is divided into 14 units. It is written with the distance learning student in mind. It is presented in a user-friendly format using a clear, lucid language. Each unit contains an Introduction and a list of Objectives to prepare the student for what to expect in the text. At the end of each unit are a Summary and a list of Key Words, to aid in recollection of concepts learnt. All units contain Self Assessment Questions and Exercises, and strategically placed Check Your Progress questions so the student can keep track of what has been discussed.

BLOCK - I
CONCEPT OF ENVIRONMENT PSYCHOLOGY

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UNIT 1 INTRODUCTION

Structure

1.0 INTRODUCTION

Environmental psychology is the interdisciplinary field of study that is concerned with the interplay between individuals and their surroundings. Environment plays a major role in the well-being and development of mental faculty of human beings. Environmental psychology also deals with socio-architecture, ecological psychology, Eco psychology, behavioural geography, person environment studies, social ecology, and environmental design research. This unit will discuss the scope of environmental psychology and the role played by environmental psychologists. The psychological benefits of nature will also be discussed.

1.1 OBJECTIVES

After going through this unit, you will be able to:

- Discuss the nature and scope of environmental psychology
- Explain the role and functions of environmental psychologists
- Examine the psychological benefits of nature

1.2 NATURE AND SCOPE OF ENVIRONMENT PSYCHOLOGY

Environment is derived from the French word 'Environ' which means 'around', 'round about', 'to surround', and 'to encompass'. Environment includes land,

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water, vegetation, air and social system. It also includes the physical and ecological environment.

Environment is thus a broad concept which includes a wide range of surroundings in which human beings perceive, experience and react to events and changes. It is quite dynamic in nature and is continuously changing with or without any human interference. Despite these changes, there is a dynamic equilibrium in the environment of a specific region. This is called balance of nature.

Environment mainly comprises *the natural environment* (such as places, geographical features like rivers, mountains, valleys; environmental conditions like temperature, rainfall, flora and fauna) and *the built up environment* (such as houses, buildings, cities, communities, etc.). Our environment encompasses a wide range of diverse surroundings in which humans experience and react to various events.

A close relationship between physical and socio-cultural environment and human being's psychological processes is seen. The environmental factors have a significant effect on both mental and behavioural activities of human beings. Mental activities refer to the way humans perceive, think, reason, attribute, believe, interpret and develop attitudes about different aspects of their environment. On the other hand, behavioural activities refer to the way human beings respond or react or behave in their environment based on their perceptions, thinking, attitudes and beliefs.

The social, economic, psychological, mental and physical well-being of a human being is also greatly affected by occurrence of different environmental hazards such as cyclones, floods, draughts, tsunami, etc.

According to Garling and Golledge (1993), and Kaplan and Kaplan (1982), environment can have a significant effect on our overall functioning.

1. **Attention:** For understanding human behaviour, we need to first understand how humans notice and perceive environment. The key component while maintaining human effectiveness in environment is to re-establish and enhance an individual's competence to willingly express their attention.
2. **Perception and cognitive maps:** How individuals perceive the nature and built of environment has been an important aspect of environmental psychology. Cognitive maps are spatial networks through which we memorise information in our brain. This information links experiences with an individual's perception of current actions, ideas and emotions. Humans recognize and perceive environment, plan and conduct these plans through these spatial networks.
3. **Ideal environments:** Everyone has a tendency to look for a place, where they can feel self-assured and competent. Humans thus tend to look for a place which seems familiar to them and where they can engage with their surroundings. Researchers have extended the concept of

environmental psychology to embrace unity and legibility. This acts as a contributor to environmental understanding. To be able to better engage and investigate within an environment, the environment should have some degree of complexity (enough information and diversity to make it worth learning about) and mystery (expectation of acquiring more information about an environment) attached to it. After all, the sense of human well-being and behavioural effectiveness is enhanced by maintaining, re-establishing and developing an ideal environment.

4. **Environmental stress and managing:** Environment in which we live can have a significant influence on our behaviours and cognitions. An unhealthy environment can lead to poor physical health, reduced selflessness and weaknesses. One needs to thus make necessary adjustments in our physical and social surroundings by establishing our privacy, having a sense of proper personal space etc., so that we are able to create a more supportive environment for ourselves. Also, each environment inherits a certain degree of stressors and only when we can make a better sense of these stressors and the circumstances around can we reduce their stressful effect on our psyche and existence.
5. **Involvement:** The main aim of Environmental psychology is to improve human participation in environmental design. It focuses on promoting and ensuring an individual's understanding of environmental issues. They also focus on human-environment participation, adjustment and organization.
6. **Protective behaviour:** Environmental psychology also aims to develop an ecologically protracting society by promoting environmentally appropriate behaviour. It also investigates environmental attitudes, perceptions and principles that people carry.

Environmental Psychology

Environmental psychology studies the intricate and complex relationship humans share with their natural environment. It basically studies the impact environment can have on human experiences, behaviour, well-being, and the reciprocal influence individuals can have on their environment. It also studies the various factors that influence environmental behaviour, and looks into the key ways to encourage pro-environmental behaviour. It for this reason that environmental psychology is also referred to as 'human factor science'. It also deals with socio-architecture, ecological psychology, Eco psychology, behavioural geography, person environment studies, social ecology, and environmental design research.

The keys aspects of environmental psychology are as follows:

1) **Socio-architecture:** The term socio-architecture was coined by psychologist Humphry Osmond and architect Kyo Izumi. They were involved in the research to find the best architectural form for the mental hospital, the OSMONDS Weyburn in 1951.

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Over the years, Osmond became one of the best research centres for the treatment of schizophrenia, and focused on gaining insight into mystical experiences one may have when experimenting with psychedelic drugs. Whereas, Weyburn hospital became a design and research lab to study the functional aspects of the architecture and the impact it can have on people with mental illness. Osmond based his ideas of hospital design on the species-habitat work of German zoologist Fritz Hediger.

To describe the stimulating or limiting effect seating can have on social interactions, Osmond coined the terms 'sociopetal' and 'sociofugal'. His work on architecture was continued by his colleague Robert Sommer.

2) **Ecological Psychology:** Ecological psychology is the scientific study of perception-action from a non-functionalism approach. Ecological psychology is largely based on the works of Roger Barker and James J. Gibson, who tried to study the relationship between perception, action, and dynamical systems and largely believed that perception and action are inseparable.

   Roger Barker argued that one cannot make accurate predictions about human behaviour unless one knows the situation or context or environment in which that human being lives. Human behaviour can be very different in different contexts; for instance, the behaviour that may seem appropriate in the setting of church may be quite different from behaviour seen when working in a factory. Also, the behaviour of different people in the same setting may be quite similar.

   James J Gibson stated that perception of the environment also influences the way humans behave in that setting. He even believed that perception is based more on information than sensation.

3) **Eco Psychology:** The term 'eco psychology' was coined by Theodore Roszak, in his book *The Voice of the Earth* in 1992. It is a therapeutic technique and ideology that tries to treat people psychologically by bringing them spiritually closer to nature as it strongly believes that human beings are born with an instinct to emotionally connect with nature instantly. It is based on the idea that although mind is shaped by the modern world but its underlying structure is created in a natural non-human environment. One of its primary goal is to expand and remedy the emotional connection between humans and nature, and promote sustainability.

   Roszak also believed that connection of human beings to nature can improve their interpersonal relationships and emotional wellbeing. Therefore, he believed that patients can improve better when treated outdoors amidst nature. He also claimed that a bad connection of

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human beings with their environment seems to lie behind psychological problems. The more we become disconnected from nature, the more we become negative and our risk of developing pathology increases.

4) **Behavioural Geography:** Behavioural Geography focuses on the cognitive processes, spatial reasoning, decision making and behaviour to understand the role played by the cognitive processes in an individual's perception of or response and reaction to their environment, using the behavioural approach.

   It tries to study the relationship between environmental perception and cognition and examines topics like the construction of cognitive maps, attachment of a place or an environment, the development of attitudes about space and place, human decisions and behaviours based on imperfect knowledge of one's environment, etc. It studies the mental maps of the individual concerning his/her environment. It researches on environmental values, meanings and preferences. Behaviour maps are prepared for exploratory behaviour, neighbourhood feelings, etc.

5) **Person Environment studies:** It makes use of psychological science to improve the interactions of people with the world around us. They study human responses to natural and technological hazards and examine the influence of different environments, such as offices, homes and urban areas, on loneliness and stress, for example. It tries to answer questions like the effect of sun on our mood or the effect of colours of the walls of your office on productivity of the employees.

6) **Social Ecology:** It studies the relationship between people and their environment and aims to study the interdependence of people, collectives and institutions. It also aims to study the social structure and organization as influenced by an organism's environment.

7) **Environmental research design:** It is a field that tries to study the interrelationship between environments, society, culture, and human behavior. The knowledge so obtained is used by architects and designers to make houses, offices and buildings.

Different perspectives of Environmental Psychology

Environmental psychology consists of many theories about how and why we act the way we do in our environment, but they tend to fall into one of the following key perspectives:

(i) Geographical Determinism

(ii) Ecological Biology

(iii) Behaviourism

(iv) Gestalt Psychology

(v) Ecological theory

(vi) Behavioural constraint theory
(vii) Adaptation level theory
(viii) Arousal theory
(ix) Environmental stress theory
(x) Environmental load theory

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Let us discuss these perspectives in detail.

(i) Geographical Determinism: It tries to study how geographic and ecological forces influence state-building, economic development and institutions. Theorists believe that too many environmental challenges can lead to destruction of civilizations and very little challenge can result in a stagnation of culture. These environmental factors have a huge impact on what we know about our societies and the way individuals live and work together.

(ii) Ecological biology: Ecological biology relies on theories of biological and sociological interdependence between organisms and their environment. It studies how organisms interact with one another and with their physical environment at many levels such as organism, population, community, ecosystem, and biosphere level. It assumes that the presence of both living and non-living factors together shape and determine the population of organisms at a place.

Organismal ecologists study morphological, physiological, or behavioral adaptations that makes it possible for an organism to live in specific habitats. They define population as a group of same species that live in the same area at the same time and they are largely interested in the study of size, density, and structure of populations and how they change over time.

Community ecologists are more interested in studying the way different populations interact with each other and its effect on the community. Ecosystem ecologists try to focus on flow of energy and recycling of nutrients among different species that live together at a place. But, ecologists working at the biosphere level are more interested in the study of how different ecosystems interact with each other and affect the entire globe in ways such as bringing a change in the climate etc.

(iii) Behaviourism: It tries to study the effect of environment on person's personality, disposition, attitude, views, and experience.

(iv) Gestalt psychologists are more interested in studying how humans perceive, think and make sense of the environment around them.

(v) Ecological theorists believe that there is an inseparable connection between the person and the environment in which they exist. They believe that the two mutually benefit each other and share a symbiotic relationship. Roger Barker studied the various ways in which the number and variety of behaviour

settings remained remarkably the same even as institutions increased in size. For example, no major difference in the behaviour of students was seen whether they studied in a large or a small school.

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(vi) **Behavioural Constraint Theory:** This theory states that when particular aspects of our environment are perceived to be threatening in nature, we react in certain ways to either escape or cope with the stressor at hand. We continue to behave in this way irrespective of whether the stressor is real or perceived. We do so, as it helps us to prepare in advance for certain stressors that we may have to face in future, thus enhancing our coping capacities and survival. When we are unable to cope with a stressor, it results in learned helplessness, which may make one feel powerful and thus reduce the motivation to take some active steps to better deal with the situation at hand.

(vii) **Adaptation Level Theory:** This theory postulates that all human beings tend to adapt to a certain level of stimulation present in their environment, which allows human beings to function at their optimum level. It also believed that too much or very little stimulation from the environment can have an undesirable effect. For instance, an ideal teacher-student ratio is 1:25. A class that has very few children may seem dull and a class that is too crowded may add to distraction level of each child and hence both the conditions are likely to have an undesirable effect. Similarly, being with few people in life may add to our loneliness and being with many people may make the place crowded and add to our irritability and anger.

(viii) **Arousal Theory:** This theory states that our behaviour and experiences get significantly affected and influenced by the degree, manner and the extent to which we feel physiologically aroused by various stimuli in our environment. Human beings are likely to perform the best, when they are optimally aroused. This physiological arousal can have a significant effect on our behaviours. For instance, people who tend to engage in high risk behaviours have a higher optimum level of arousal compared to others. Similarly, people who tend to get satisfied easily and have a lesser need for excitement tend to have lower optimum level of arousal compared to others.

In addition, the optimum level of each individual is not a static figure as it may vary depending on the task at hand. For instance, we need high optimum level of arousal to perform a simple task but a low level of arousal to perform more complex and difficult tasks. For example, a high level of arousal in our exams, can add to anxiety and impair our performance, whereas a small level of arousal may not motivate us to study hard for our exams.

(ix) **Environmental Stress Theory:** This theory proposes that humans respond to environmental stimuli based on their cognitive and autonomic evaluation of the stressor. It is these evaluations that help us determine whether an environmental stimuli is stressful or not for us. If a stimulus is perceived as

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threatening in nature, it results in a stressful reaction. If we perceive a stranger standing at the corner of a street at night alone as a burglar, we are likely to react in a stressful manner by either avoiding going through that street or running back home as quickly as possible.

(x) **Environmental Load Theory:** This theory states that human beings have a certain capacity to deal with a specific amount of information at a given point in time. To deal with the problem of information over load, human beings try to focus on relevant information and tend to ignore other pieces of information, as this allows them to process this information better. That is why, when we are engaged in an interesting interaction with someone, we tend to remember the conversation well, but may not remember the colour of his dress or the brand of his shoes.

Characteristics of environmental psychology

Environmental psychology, according to Gifford (2007), can be defined as the study of transactions between individuals and their physical settings.

Some of its main characteristics are as follows:

(i) **A holistic molar perspective:** This means that environmental psychology examines behaviour in its respective context and tries to not only study complex psychological processes and environmental factors but also the dynamic relationship between them.

(ii) **An applied problem-solving perspective:** Environmental psychology tries to study the basic principles of behaviour in order to find out solutions of social problems involving the physical environment.

(iii) **A broad and eclectic methodology:** It refers to various methods environmental psychologists use to study this complex multi-factorial relationship between human beings and the environment in which they live such as laboratory experiments, field experiments, survey studies and natural observations, etc.

(iv) **A wide range of levels of analysis:** Environmental psychologists do analysis at various levels such as

- Micronveleles, which is the study of the effect of noise on the performance of a task;
- Moderate scales of analysis of the design and domestic use;
- Large units of study such as the design of communities and cities.

They also study the following:

- Important psychological processes like perception of the environment, spatial cognition, and personality as they filter and structure human experience and behaviour, and
- The management of social space: personal space, territoriality, crowding.

(v) **A wide range of theoretical approaches:** Environmental psychologists borrow different theoretical ideas from other areas of psychology and other social sciences rather than developing their own theories to study human environment interactions. Barker was the only environmental psychologist who developed his theory of ecological psychology.

Goals of environmental psychology

The key goals of environmental psychology are as follows:

- To study human-environmental interactions
- To use this knowledge to solve several problems faced by humans in the environment in which they live
- To create, manage, protect, and restore environments that promote proper behaviour

Scope and role of environmental psychology

- Environment psychology aims to influence work of design professionals (architects, interior designers, urban planners, etc.) and improve the human environment.
- In the 1960s, environment psychology was developed out of ergonomics. Ergonomics is the application of scientific information concerning humans to the designs of objects, systems and environment for human use.
- Environments and environmental stressors and coping have their origins within the discipline of ergonomics. It deals with measurable aspects of environment such as measuring lighting, noise, etc.
- To keep the balance between man and the environment, a significant role is played by Environmental psychologists. In this, they consider urban environment, rural environment, slum environment, work environment, hospital environment, institutional environment and its impact on human behaviour.

Check Your Progress

1. Who coined the term 'socio-architecture'?
2. Who coined the term 'eco psychology'?
3. What is the Behavioural Constraint Theory?
4. What are key goals of environment psychology?

1.3 ROLE AND FUNCTIONS OF ENVIRONMENTAL PSYCHOLOGISTS

The manner in which people are affected by their environment is investigated by an environmental psychologist. They examine how the home, workroom and school

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make individuals feel, and how these environments provoke people to act. They also look into natural settings and the layout of towns and cities, and the cultural centres within them. They recommend modifications for changing the environment to encourage a particular behaviour. For instance, in order to look for ways to encourage shoppers to buy more of products, they may focus on the physical settings at the store.

Role of an Environmental Psychologist

The role of an environmental psychologist is as follows:

1) Environmental psychologists deal with issues such as the effect of environmental stress on performance of an individual, constituents of a restorative environment, and how information processing varies in different environments.
2) The focus is on a wide array of settings including the natural environment and social settings and constructed buildings.
3) Environmental psychologists aim to establish how an individual's surroundings can have a profound impact on the affective, behavioural and cognitive aspects.
4) They aim to determine ideal settings for various segments of the population and hence view environmental consequences within the social as well as physical context of the environment.
5) They may share their ideas and recommendations to various bodies including the government, private industries, hospitals, schools and retail. For example, in order to enhance productivity and learning, they may take into consideration sensory aspects of smell, sound, touch, etc. as well as temperature when making suggestions to schools organisation about environmental settings.
6) The environmental psychologists also conduct researches and analyse the collected data. The findings are then communicated to the people involved in decision making and policy making within a company or an organization.
7) A multidisciplinary approach is taken into consideration by the environmental psychologists. For example, an environmental psychologist who is interested in studying the built structure may have a background in architecture and construction as well as psychology.
8) An environmental psychologist follows the steps of interviewing people, making observations and reviewing an organization's plans for the future.
9) In order to seek the best explanation so as to improve existing features of the environment, experiments are required to be conducted.
10) They determine how environment has an impact on the thoughts and actions of an individual.
11) They may be summoned to present their ideas and suggestions in public forums, especially in the case of municipal and civil projects that have an influence on the local residents.

Functions of environmental psychologist

An environmental psychologist aims to perform the following functions:

1) They investigate how people are affected by their environments.
2) They find how the home, workplace and school make people feel, and how these environments prompt people to act.
3) They look into natural settings as well as the layout of towns and cities, and the cultural centers within them.

1.3.1 Ways that Environmental Psychology Has Changed the World

Our psychological well-being is closely and inescapably linked with the environment we live in. The effort to set things right gives environmental psychologists pleasure and, sometimes, a sense of personal revival. Environmental psychology is both value and problem oriented and includes theory, research, and procedures that can improve our relationship with the environment.

People's homes, workplace and recreational settings, the visual effects of buildings, the negative consequences of cities, the therapeutic role of nature, environmental attitudes and long-term behaviour all are examined by Environmental psychologists.

Conservation psychology

The focus of Conservation psychology is on the interplay between humans and the rest of nature, with an emphasis on ways to support and promote conservation of the natural world.

The development of environmental attitude is investigated by conservation psychologists. It may also carry out experiments on the therapeutic effects of nature on mental health; for example, how spending time in the open reduces stress or enhances concentration.

Eco psychology

The focus of Conservation psychology is on changing behaviours. On the other hand, eco psychology is more concentrated on ties between environmental and societal degradation. It views human well-being as directly linked to environmental well-being and concentrates on healing the human society alongside with healing the nature.

The emotional responses to nature as well as the effects of environmental issues such as global climate change, and environmental identification and concern is studied by eco psychology.

Challenges

Sustainability has been embraced by environmental psychology progressively as its main focal point of research, providing us with many useful insights and

mechanisms for advocating sustainability at regional and global levels. Environmental psychologists should be more engaged, in order to make a significant difference in the battle to save the planet from ecological and social deterioration.

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1.3.2 Understanding Ordinary Landscapes: Psychological Benefits of Nature

Studies have shown that time spent in nature is an antidote for stress: Our blood pressure as well as our hormones levels can be lowered; it reduces nervous system arousal, enhances immune system function, increases self-esteem, reduces anxiety, and improves mood.

Benefits of Being in Nature

Given below are the benefits of being in nature:

- It boosts physical activity.
- It gives us access to everyday green spaces and encourages people to simply get out the door.
- Stress is reduced.
- Short term and working memories are improved.
- Inflammation is reduced.
- It relieves depression and anxiety.

Nature Improves your Health

Going outdoors and interacting with nature can improve health by reducing blood pressure and cortisol levels. Long-term benefit of nature is that it lowers the risk of cancer or disease.

Lowers Blood Pressure

Those participants who didn't spend 30 minutes or more per week in nature were 9% more likely to have high blood pressure. Reducing the blood pressure can save people from taking daily medication and cuts the risk of heart disease, kidney disease, diabetes complications and eye disease.

More Physical Activity

Moderate to vigorous daily activity leads to weight loss, lower levels of inflammation, a reduced risk of cancer, diabetes and cardiovascular disease. You also get a dose of vitamin D from the sun which could reduce your risk of developing Alzheimer's and dementia.

Stress Relief

Our cortisol (stress hormone) levels can be decreased by spending time outdoors.

Nature Improves your Mood

In preventing and treating psychological problems, the medicinal world has revealed the power of nature.

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Reduces Depression

Taking a walk-in nearby park/ spending some time with nature has reduced depression.

Recalibrates the Brain

Interacting and spending time with nature can reduce mental fatigue. Spending time with nature can help the mind focus better.

More Enthusiasm and Relaxed Attitude about Work

At times our concentration levels start to dip after a hard morning of work. In such instances, a quick walk outside can be enough to refresh the mind. We can also take a short tea/coffee break. A short walk within the office cabin can also be of great help.

Some Ideas for Spending Time in Nature

Half an Hour is All You Need

- Try to eat your lunch outside
- Go for a Walk
- Walking Meetings
- Take your Yoga or Meditation Outside
- Watch a Sunset or Sunrise

If You Have Some Time

- Do Some Gardening
- Go for a Walk Along the Coast
- Go to an Open Garden

For One Day

- Go on a Picnic
- Visit an Area you haven't Seen Before
- Go Fruit Picking
- Spend a Day Decorating your Home with Indoor Plants

For One Week

- Go Camping

- Take an Overseas Holiday
- Redecorate your Home Inspired by Nature

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Check Your Progress

5. State the main functions of an environmental psychologist.
6. What is the main focus of conservation psychology?
7. Mention any two benefits of being in nature.

1.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The term socio-architecture was coined by psychologist Humphry Osmond and architect Kyo Izumi.
2. The term 'eco psychology' was coined by Theodore Roszak, in his book *The Voice of the Earth* in 1992.
3. Behavioural Constraint Theory states that when particular aspects of our environment are perceived to be threatening in nature, we react in certain ways to either escape or cope with the stressor at hand. We continue to behave in this way irrespective of whether the stressor is real or perceived.
4. The key goals of environmental psychology are as follows:
   - To study human-environmental interactions
   - To use this knowledge to solve several problems faced by humans in the environment in which they live
   - To create, manage, protect, and restore environments that promote proper behaviour
5. An environmental psychologist aims to perform the following functions:
   - They investigate how people are affected by their environments.
   - They find how the home, workplace and school make people feel, and how these environments prompt people to act.
   - They look into natural settings as well as the layout of towns and cities, and the cultural centers within them.
6. The focus of conservation psychology is on the interplay between humans and the rest of nature, with an emphasis on ways to support and promote conservation of the natural world.
7. Given below are two benefits of being in nature:
   - It boosts physical activity.
   - Stress is reduced.

1.5 SUMMARY

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- Environment mainly comprises *the natural environment* (such as places, geographical features like rivers, mountains, valleys; environmental conditions like temperature, rainfall, flora and fauna) and *the built up environment* (such as houses, buildings, cities, communities, etc.).
- Environmental Psychology studies the intricate and complex relationship humans share with their natural environment. It basically studies the impact environment can have on human experiences, behaviour, well-being, and the reciprocal influence individuals can have on their environment.
- The term socio-architecture was coined by psychologist Humphry Osmond and architect Kyo Izumi Canada. They were involved in the research to find the best architectural form for the mental hospital, the OSMONDS Weyburn in 1951.
- Ecological psychology is the scientific study of perception-action from a non-functionalism approach. Ecological psychology is largely based on the works of Roger Barker and James J. Gibson, who tried to study the relationship between perception, action, and dynamical systems and largely believed that perception and action are inseparable.
- The term 'eco psychology' was coined by Theodore Roszak, in his book *The Voice of the Earth* in 1992. It is a therapeutic technique and ideology that tries to treat people psychologically by bringing them spiritually closer to nature as it strongly believes that human beings are born with an instinct to emotionally connect with nature instantly.
- Behavioural Geography focuses on the cognitive processes, spatial reasoning, decision making and behaviour to understand the role played by the cognitive processes in an individual's perception of or response and reaction to their environment, using the behavioural approach.
- Environmental psychology consists of many theories about how and why we act the way we do in our environment. These theories are concerned with Geographical Determinism, Ecological Biology, Behaviourism, Gestalt Psychology, Ecological theory, Behavioural constraint theory, Adaptation level theory, Arousal theory , Environmental stress theory, and Environmental load theory
- The manner in which people are affected by their environment is investigated by an environmental psychologist. They examine how the home, workroom and school make individuals feel, and how these environments provoke people to act. They also look into natural settings and the layout of towns and cities, and the cultural centres within them. They recommend modifications for changing the environment to encourage a particular behaviour.

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- Our psychological well-being is closely and inescapably linked with the environment we live in. The effort to set things right gives environmental psychologists pleasure and, sometimes, a sense of personal revival. Environmental psychology is both value and problem oriented and includes theory, research, and procedures that can improve our relationship with the environment.
- The focus of Conservation psychology is on the interplay between humans and the rest of nature, with an emphasis on ways to support and promote conservation of the natural world. The focus of Conservation psychology is on changing behaviours. On the other hand, eco psychology is more concentrated on ties between environmental and societal degradation.
- Studies have shown that time spent in nature is an antidote for stress. Our blood pressure as well as our hormones levels can be lowered. It reduces nervous system arousal, enhances immune system function, increases self-esteem, reduces anxiety, and improves mood.

1.6 KEY WORDS

- **Environmental Psychology:** It is an interdisciplinary field that focuses on the interplay between individuals and their surroundings. It basically studies the impact environment can have on human experiences, behaviour, well-being, and the reciprocal influence individuals can have on their environment.
- **Behavioural Constraint Theory:** This theory states that when particular aspects of our environment are perceived to be threatening in nature, we react in certain ways to either escape or cope with the stressor at hand. We continue to behave in this way irrespective of whether the stressor is real or perceived.
- **Environmental Load Theory:** This theory states that human beings have a certain capacity to deal with a specific amount of information at a given point in time. To deal with the problem of information over load, human beings try to focus on relevant information and tend to ignore other pieces of information, as this allows them to process this information better.

1.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What is environmental psychology?
2. Write a short note on environmental stress theory.

3. Briefly mention the role of environmental psychologists in the current scenario.
4. What are the psychological benefits of nature?

Long-Answer Questions

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1. Examine the effect of the environment on our overall functioning.
2. Discuss in detail the different perspectives of environmental psychology.
3. Explain the main characteristics of environmental psychology.

1.8 FURTHER READINGS

Nagar, Dinesh. 2006. *Environmental Psychology.* New Delhi: Concept Publishing Company.

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UNIT 2 HISTORY AND THEORIES OF ENVIRONMENTAL PSYCHOLOGY

Structure

2.0 INTRODUCTION

Environmental psychology is often referred to as a multi-disciplinary paradigm that finds its mention in other fields of study. The 1960s saw an emergence of this discipline as scholars were vexed by the degrading environment. Environment was seen as a major factor in the development and ongoing conduct of people. Scholars took to developing scientific methods to examine the relationship between physical environment and human behaviour. Various models and theories were also developed. This unit will discuss the nature and scope of environmental psychology. The theories and models of environment behaviour will also be explained.

2.1 OBJECTIVES

After going through this unit, you will be able to:

- Discuss the nature and scope of environmental psychology
- Explain the history of environmental psychology
- Examine the scientific method used in environmental psychology
- Describe the various theories and models of environment behaviour

2.2 NATURE AND SCOPE

In environmental psychology, the term 'environment' is referred to as a tangible and imagined interpretation of the world, which includes both architectural and

social surroundings. It also includes natural environments, social settings and constructed environments as well as considers the learning and informational environment. It is an interdisciplinary field that throws light on human beings and their surroundings. It also deals with man's ability to adapt both physically and mentally to the various changes that continue to take place in our environment.

Environmental psychology is a multi-disciplinary paradigm which draws a lot from the knowledge of people from other disciplines. It relies on findings of geographers, economists, geologists, policy makers, psychologists, sociologists, anthropologists, educators, etc. Environmental psychology is also known as human factor science or cognitive ergonomics or environmental social sciences.

It explores dissimilar issues which are of great significance. Some of these issues are listed below:

- Common property resource management
- The effect of environmental stress on human performance
- The characteristics of restorative environments
- Human information processing
- The promotion of durable conservation behaviour.

Environmental psychology believes that environment should be interpreted as a major factor in the development and ongoing conduct of people.

1. Environmental psychology gives more attention to the environment which have focused exclusively on micro-level stimuli and events like people's homes, neighbourhoods, and work and community settings.
2. Kurt Lewin's 'action research' orientation (1946), sets scientific goals of analysing and explaining the nature of people and environmental transactions with the more practical goal of enhancing. It optimises and enhances peoples' relationship with their environment through effective planning.
3. Environmental Psychology is a multidisciplinary approach to the study of environment and behaviour since it focuses on analysing and enhancing the quality of people's relationships with their physical environments. It also incorporates the perspectives of architecture, urban planning, psychology, anthropology, sociology, geography, and other fields.

The 'fundamental significance of environmental psychology for the design professions lies in its potential capacity to provide a body of knowledge conceptual and empirical for understanding the relationships between human behaviour and experience in the built environment.'

In other words, environmental psychology can be defined as the scientific study of the transactions and interrelationships between people and their physical surroundings (including built and natural environments, the use and abuse of nature and natural resources, and sustainability-related behaviour.

2.2.1 History of Environmental Psychology

The scientific study of *human made environment* began in 1960, motivated by degrading environment (e.g., Proshansky et al. 1970).

Craik (1968) outlined the research strategies which were parallel to personality assessment. It was necessary to set up the laboratory in the physical environment for development purpose but also for assessment of how people react to such settings. There was an opportunity for the physiological psychologists to study/research how health and well-being are related to the physical environment. Even cognitive psychologists explored the possibility of investigating the ecological validity of their research in environmental psychology.

The field of environmental psychology also benefitted from the work of design professionals who were more sensitive to the subtle effects of designed environment on human behaviour. In addition, social psychologist noticed a significant decline in the quality of urban life and soon physiological psychologists began to study both the positive and negative impact of physical environment on human health and well-being.

Thereafter cognitive psychologists became concerned about the ecological validity of their research in environmental psychology and began to study the acquisition, representation and use of everyday knowledge of the physical environment. Later, social psychologists began to study how physical environment interacts with social environment and shapes, influences and governs human behaviour.

Annual Review of Psychology (Sundstrom et al. (1996) published the historical aspects of environmental psychology while focusing on its current status which is documented in a series of comprehensive reviews. Daniel Stokols and Irwin Altman published *Handbook of Environmental Psychology* in 1987. At present, research in the area of Environmental psychology can be seen in the following three journals–

a) Journal of Environmental Psychology, which represents the psychological perspective

b) Environment and Behaviour, which covers topics related to the interdisciplinary field of environment, behaviour and research.

c) Journal of Architectural and Planning Research, which covers topics related to architectural and environmental design research.

Scope of environmental psychology

The application of environmental psychology is seen in various other disciplines. The scope of environmental psychology has been discussed below.

- Environmental psychology aims to examine the relationship between physical environment and human behaviour.

- It defines *environment* very broadly including all that is natural on the planet as well as social settings, built environments, learning environments and informational environments.
- Closely related fields include architectural psychology, socio-architecture, behavioural geography, environmental sociology, social ecology, and environmental design research, environmental and urban design and planning, environmental aesthetics, interior design, environmental impact assessment, environmental philosophy, sustainability science, environmental risk perception and management, and, of course, conservation psychology and disaster psychology, to name a few.
- It also aims at influencing the work of design professionals such as architects, interior designers, urban planners etc. as a way to improve human environment.
- It studies the relationship between socio-physical environment and human behaviour such as the effect of light, noise, crowding, etc. on human behaviour, mood perception, cognition, etc.
- They study various aspects of human-environment interactions to maintain a healthy balance between the man and the environment.

The various aspects that should be considered while discussing environmental psychology are as follows:

1) **Urbanization and environmental psychology:** The need to earn more money, enjoy better facilities and better educational and job opportunities has led many people to migrate from rural areas to settle in urban areas. This has worsened the environment of urban settlements, thereby creating a serious social crisis and negatively affecting the quality of life of inhabitants. It has led to the emergence of several problems such as shortage of housing, crowded places, increased level of stress, crime, etc.
2) **Slum Environment and Environmental psychology:** Slums consists of huts, group of huts, buildings or areas characterised by over-crowding, deteriorating unsanitary conditions, lack of interest in formal education, lack of proper amenities like clean drinking water, clean toilets etc., which tends to have a negative effect on the health, safety and moral of the inhabitants of the slum. Such kind of environmental deficiencies seen in the slum environments lead to significant difference in the development of perceptual and cognitive abilities of children that live in slums compared to children who live in relatively better environmental conditions. To study the effect of socio-cultural deprivation, Sinha in 1977 proposed an ecological model that focuses on the following:
   - Physical and material space
   - Social roles and relationship
   - General services and amenities available.

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3) **Crowding and environmental psychology:** Crowding can affect human behaviour in several ways. It can alter behaviour, negatively affect the sense of morality, increase environmental health problems, lead to social conflict and psychological stress, and increase the risk of occurrence of psychopathology. Each organism has a limited capacity to deal with and adapt to various stressors found in their environment and this increases their rate of survival. That is why Environmental psychologists try to modify the existing environmental conditions so that people can live in a state of balance.
4) **Work environment and environmental psychology:** Various aspects of work environment such as noise, temperature, space, location, employer-employee relationship, employee-employee relationships, politics at work place, etc. can have a significant effect on the quality and productivity of work. A good, healthy, favourable work environment is known to enhance productivity but a poor, unhealthy and uncongenial environment is known to reduce productivity, increase absenteeism and may lower motivation at work.
5) **Quality of life and environmental psychology:** Quality of life refers to overall evaluation of life conditions as experienced by an individual or a group of individuals. It includes several aspects such as material satisfaction of vital needs, personal development, self-realization, healthy ecosystem, sense of security, employment, education, healthy socialization, rewarding and stimulating environment, etc. Thus, environmental psychologists have a great job to do in enhancing the human environment relationship.
6) **Residential environment and environmental psychology:** Human beings not only emotionally invest in people but also get attached to places, things and objects in their life. They develop memories around these and feel anxious when separated from it. We feel attached to both our community and home and the quality of attachment that we share with them determine how satisfied or dissatisfied we feel. Environmental psychologist can thus design, manage, protect and or restore environments that enhance reasonable behaviour, and predict what the likely outcomes can be when these conditions are not met and help not only diagnose but also solve these problems.

2.2.2 Focus of Environmental Psychology

Environmental psychology attempts to focus on the inter-relational aspects of individuals and their surroundings. The theories, researches, and practices of environmental psychology is aimed at enhancing our relationship with the natural environment and making constructions more human friendly. It also includes human factors science, cognitive ergonomics, ecological psychology, environment-behavior studies, and person-environment studies. The current focus is on attitudes towards

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the physical environment, and in particular on the natural world, which has antecedents in the wider literature.

In addition, environmental psychologist, focus on various aspects of human-environment relationship. They are as follows:

Environmental stress and coping: Physical and social settings that add to one's stress such as noise, extreme climatic conditions, lack of freedom, absence of preference, lack of certainty, stimulus overload, etc. can have a significant negative effect on our physical and mental well-beings. Human beings can change their physical and social settings to create more supportive environments. They can also change the way they interpret a situation or a setting to reduce its harmful effects on them.

In this regard, environmental psychologists try to increase involvement of human beings in environmental design, management and restorative effects. Based on the knowledge of human psyche, environmental psychologists try to develop an ecologically sustainable society by exploring environmental attitudes, perceptions and values to devise intervention techniques for promoting environmentally appropriate behaviour.

Problem Conceptualization: Environmental psychologists try to study a research problem along with its three facets namely — the person or the group; the environment and the activity the person or group is engaged in — by analysing them in different depths ranging from molar to molecular level. Environmental psychologists are interested in the study of both stable (abilities, attitudes, personality, etc.) and transient (knowledge, skill, motivation, etc.) characteristics of human-environment interaction.

Choice of environment: Human beings either willingly choose or are forced to choose the environment in which live and spend a major part of their life and this choice can have an impact on them. Some environmental psychologists try to study the residential or immigration choices people make and the life-long consequences these choices can have on their life. Yet other environmental psychologist focus on studying the daily choice of activities people engage in their environment such as shopping locations, recreational activities, etc.

In addition, field and laboratory studies investigate acquisition, representation and use of spatial and non-spatial knowledge of the environment.

Impact of environment on humans: Environmental factors can have both a direct and an indirect impact on human psyche. It tries to study the detrimental effects of environmental stressors such as noise, temperature, crowding, threat of natural disaster, technological catastrophes, etc. It also tries to study the beneficial, restorative and stress-reducing effects of the environment. It studies the effect of social environment, the people we interact with, the kind and quality of interpersonal relationships we share on human behaviour and interactions. All this can either add to our level of satisfaction or make us quite dissatisfied in life.

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Impact of human behaviour on the environment: Environmental psychology tries to study the various methods of enhancing pro-social behaviour in humans so that the negative effect of human action on the environment can be minimised. It tries to encourage humans to increasingly engage in pro-social behaviours such as habits, attitudes, moral values, etc.

Forecasting the future: Environmental psychologists also deal with some global problems like air pollution, overuse of resources and tries to develop effective methods to deal with these problems such as focussing on developing new sustainable technologies such as zero emission vehicles. It tries to forecast the effect of various transformations such as homes turning into work places, electronic shopping, etc. on human behaviour.

Check Your Progress

1. Who wrote the *Handbook of Environmental Psychology*?
2. What are the negative effects of crowding?

2.3 SCIENTIFIC METHOD USED IN ENVIRONMENTAL PSYCHOLOGY

The scientific method begins with making observations and asking questions. Obviously, questions arise out of curiosity, because people want to learn more about what they are observing. To answer their questions, researchers use the *scientific method*, a structured technique that is used to test ideas and get answers to scientific questions. These methods have five basic steps but can vary according to discipline. They are as follows:

a) Make observations
b) Ask questions
c) Formulate a hypothesis
d) Conduct an experiment
e) Interpret results and make conclusions

Let us discuss these steps in detail.

a) **Observations and Questions:** Making an observation is the building block of the scientific method. Once an observation is made, the researcher is ready to satiate his curiosity by looking for answers. At this point, they come across many more questions. They *ask questions* about their observation (the second step). Depending on the research, these questions can be very specific or open-ended.

b) **Hypothesis:** A hypothesis is a proposed explanation or an inferable statement that aims to answer the question formulated. It needs to be tested through the method of experimentation.

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c) **Experiment:** While conducting an experiment, the researcher collects data that will further be used to either support or reject the given hypothesis. An experiment mostly includes an independent variable and a dependent variable, wherein the independent variable is the factor that the scientist seeks to alter and dependent is the one which is the factor that is being measured. When an experiment includes these aspects, it is referred to as a controlled experiment because the scientist is in control of how each variable influences the experiment.

d) **Interpret Results and Make Conclusions:** In the fifth stage of research, the researcher includes analysis of the data and makes conclusions about the hypothesis. The analysis of the data includes statistically determining how the data from the experiment relates to the hypothesis and predictions proposed. Then conclusions are made by comparing the data with the hypothesis. If the data supports the hypothesis, it is accepted. If the hypothesis does not support the findings, then the researcher conducts a new experiment and determines if their new data supports or refutes their new hypothesis.

Key methods used by environmental psychologists to study human-environment interactions are as follows:

1) Observation Method

To study environment-behaviour relationships, environmental psychologists make use of direct and indirect observation methods. Indirect observation involves studying personal diaries, informants and tracing measures. For example, Rochester Interaction record and related social behaviour inventory, Standardized event-contingent reporting methods are reliable and valid ways to learn about the participant's daily interactions from their notes.

Direct observation method involves researcher trying to make sense of human-environment interactions by directly observing human behaviour in different environmental settings using various sense organs. Audio-video recording methods are also used to assist the process of making more accurate observations. In some cases, direct observation is more accurate and useful method to study human-environment interactions. It is more immediate and objective than self-report methods, where participants recall events that may be biased.

When observation method is used in field settings, the information so obtained has greater external validity and hence can be generalized with more accuracy. Observation method also helps to gain preliminary data for hypothesis generation or design ideas. Research may start engaging in casual observation followed by in-depth systematic observation.

The method of naturalistic observation involves making observation without making any changes in the environment or interfering with human behaviour in any manner. While engaging in naturalistic observation method, the researcher should try to conceal himself from the setting so that his presence does not affect human behaviour in the environment.

Observations can be noted at various intervals by making use of event sampling and time sampling method. Event sampling refers to recording the event each time it occurs, whereas, time sampling refers to recording behaviour at random or regular intervals.

When using this method, the researcher must record everything about the behaviour or the situation without any censorship so that the data can be analysed to identify the patterns. Spot sampling is an anthropological method of observation that is used to record individual's behaviour at random times in a given location; for example, studying the shopping behaviour of adults in a super market.

Observation method is not free from biases, where several cultural and social biases may affect the research findings. Such biases can also influence what behaviour a researcher must study. Experimental bias may also at times make the researcher observe those behaviour that they expect.

The method of active observation is the same as the method of passive observation except that here the researcher tries to establish cause and effect relationship between the changed environment and the resultant behaviour. The method of active observation requires one to be creative, patient, and calls for effort to produce reliable and convincing evidence.

2) Behaviour Mapping

It is a method that involves noting the place where a behaviour takes place. Behaviour maps may take the form of charts with check-boxes for potential behaviours. Behaviour mapping can be done using event contingent (mapping behaviour whenever it occurs) or time contingent (observing behaviour based on pre-determined intervals) manner.

In order to map behaviour effectively, Ittelson et al (1970), proposed five necessary elements such as:

- The graphic or physical map itself
- The definitions, codes and categories of behavior being noted
- The schedule of observation
- The systematic procedure, and
- The counting or coding system being used

Behavioural maps are frequently used for programming of buildings and post-occupancy evaluations.

Check Your Progress

3. What are the five steps in the scientific method?
4. What is a hypothesis?
5. What is spot sampling?

2.4 MODELS AND THEORIES OF ENVIRONMENT BEHAVIOUR RELATIONSHIP

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An effective model can improve our insights into behaviour and help us understand what we can do to change it. Our behaviours are a result of factors that are too complex to understand; no single model or theory constitutes an all-encompassing 'understand scope'. We can get a mental image of our relationships between factors that influence behaviour through flow charts, diagrams, pictures or word description, although we may not completely understand it.

Some models promote pro-environmental behaviour that concentrates on individual behaviour change and help one to change an individual habit like smoking. On the other hand, there are various others that aim to focus on community and try to take in account the social influences or broader, structural aspects such the amount of a resource that is left, say water during a drought or the availability or cost of products such as solar panels.

Theories of Environment-Behaviour Relationship

Following are a few of the most widely used behaviour change theories and models used in behaviour change for the environment.

1) **Ajzen's Theory of Planned Behaviour:** This theory states that there are specific factors that drive an individual's behaviour which include beliefs about the likely consequences of an action, be it favourable or unfavourable, perceived social pressure or subjective norms and perceived behavioural control over the given action. The strength of these factors determine the probability of an individual to form a behavioural intention and consequently act.
2) **Andreasen's Social Marketing Model:** In this approach, marketing strategies and techniques are applied in order to achieve specific behavioural goals for a social good. Social science and strategies may also be integrated with this approach. The primary goal is to learn about the needs and wants of the individuals in a specific target group rather than persuading them to adopt what we happen to be offering.
3) **Gifford's Social Dilemma System Model:** Individuals and groups use resources along a continuum that ranges from pure community or environmental interest to pure self-interest. They face social dilemmas as these interests appear to come into conflict with each other.

   The Social Dilemma System Model is a comprehensive model that explains how decision making is influenced by a variety of factors which further influences the kind of strategies people use to make decisions about cooperation. The outcomes in the given scenario exist for both, the decision maker (e.g., feelings of satisfaction, anger, regret) and the environment (e.g.,

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considering whether a resource is depleted or sustained or contributions made for the benefit of the society).

4) **Roger's Diffusion of Innovation Theory:** The theory aims to focus on the cultural spread of ideas. The process by which an innovation is communicated and spread via various channels over time among the members of a social system is known as diffusion. The willingness of various people to adopt innovation varies. They may be early or late adopters, progressing through various stages.

5) **Stern's Value Belief Norm (VBN) Theory:** For behaviours which are not strongly constrained by contextual forces, personal norms play a significant role in driving an individual's choice about pro-environmental actions. Norms are stimulated when an individual believes that infringing them would have negative consequences on the things that they value and that by taking appropriate actions, they would be significantly responsible for those consequences. Personal values (e.g., altruistic values, egoistic values) are forerunners of environmental beliefs.

6) **Primitive Models:** These models were based on the assumption that educating the public on various ecological and environmental issues could bring about a desired change in human behaviour.

7) **Behavioural Change Model:** This model believed that if people were better informed and were more aware of the environmental problems, they would automatically be motivated to behave in an environmentally responsible manner. This knowledge would bring the desired change in the attitude of people and a subsequent change would be seen in the behaviour in accordance with the attitude people carried.

   Later, research found out that a multitude of variables interact in different degrees to influence environmentally responsible behaviour. It was found that presence or absence of environmental knowledge alone may not be linked with good or poor sustainable environmental behaviour respectively.

8) **Theory of environmentally responsible behaviour (ERB):** According to Hines, Hungerford and Tomera, an intention of acting, locus of control, attitude, sense of personal responsibility, and knowledge play a more important role in influencing ERB. Of these factors, an internal control centre was closely related to the intention of acting, which eventually determined an individual's ERB.

9) **Reasoned/Responsible action theory:** This theory was proposed by Ajzen and Fishbein, and they believed that human behaviour is grounded in rational thought. The attitude of an individual is shaped by subjective norms and beliefs, and situational factors influence these variables' relative importance. The theory highlighted how at times people have good intentions, but these intentions do not get translated into behaviour, because people may lack confidence or feel a lack of control over their behaviour.

Glenda Hanna in 1995, found that past experience and demographic factors tend to interact with an individual's knowledge and ability to act. This interaction contributes to developing environmentally favourable attitude towards relevant issues that in turn reinforce the intention to act responsibly. Finally, these intentions are given concrete expression through individual's specific actions.

10) **Theory of Planned Behaviour:** This theory considers the intention to act (which includes various cognitive variables such as knowledge of action strategies and issues, and action skills and personality variables such as locus of control, attitudes and personal responsibility) and objective situational factor as direct determinants of pro-environmental behaviour.

    This theory further suggested that human behaviour is influenced by three belief constructs — beliefs about consequences, expectations of others and things that may support or prevent behaviour. When a person understands that he/she has control over a certain situation, his/her behavioral intentions reflect this understanding.

11) **The Environmental Citizenship Model:** This model was proposed by Hungerford and Volk. They gave three stages of educational involvement ranging from first exposure (entry) to real involvement (empowerment), and then suggested that each stage had certain knowledge and attitude characteristics.

    They grouped various variables that influence person's decision to take action. They are as follows:

    - **Entry-level variables** such as general sensitivity to and knowledge of the environment
    - **Ownership variables**, which includes in-depth knowledge, personal commitment, and resolve
    - **Empowerment variables** such as action skills, locus of control, and intention to act

    This model has the following three characteristics:

    - It identifies several variables required to be an environmentally literate citizen.
    - It provides a basis for the classification and separation of environmental literacy variables according to their importance either as a major variable or a minor variable.
    - It provides a framework/scale to identify the level of an individual in the literacy ladder, which enables us to figure out, whether a citizen is at an entry level, ownership level, empowerment level or has become an environmentally responsible citizen.

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12) **Model of Human Interaction with the Environment:** It was given by Hammond in 1995 and describes four interactions between human activity and the environment. They are as follows:

- **Source:** People derive minerals, energy, food, fibers, and other natural resources of use in economic activity from the environment. In this process, humans tend to potentially deplete these resources or degrade the biological systems (such as soils) on which continued production depends.
- **Sink:** Natural resources are transformed by industrial activity into products (such as pesticides) and energy services that are used or disseminated and ultimately discarded or dissipated, thus creating pollution and wastes that (unless recycled) flow back into the environment.
- **Life support:** The earth's ecosystems provide essential life-support services, ranging from the breakdown of organic wastes to nutrient recycling to oxygen production to the maintenance of biodiversity. As human activity expands and degrades or encroaches upon ecosystems, it can reduce the environment's ability to provide such services.
- **Impact on human welfare:** Polluted air and water and contaminated food affect human health and welfare directly.

Thus this model explains the impact human activities have on the environment and tries to enhance our understanding of possible outcomes for different behaviours within the environment.

13) **The Value-Belief-Norm Theory of Environmentalism (Paul Stern 1999):** It provides a detailed explanation of the human-environment interaction and how these interactions can affect each other, taking into consideration a relatively ample number of variables responsible for cause and action. This theory is found to be most useful for the following reasons:

- It offers a good explanation for the causes of inclination toward pro-environmental behaviour.
- It states that environmental practices depend on a broad range of causal factors, both general and behaviour-specific. A general theory of environmentalism may therefore not be very useful for changing specific behaviours.
- It emphasizes that different types of environmental practices have different causes which may vary greatly across behaviours and individuals; hence, each target behaviour should be theorized separately.

14) **Diffusion of Innovation Model (Everett Rogers 1962):** According to this theory, change happens in a population when there is willingness to accept new ideas. Behaviour gets affected across a community through change agents. Involvement, social support, response information and intrinsic control are certain factors that have an influence on change agents.

At the level of the individual, behavioural adoption occurs through the stages of knowledge, persuasion, decision, implementation and confirmation.

15) **Health Belief Theory:** This theory proposes that beliefs help shape behaviour. People acquire beliefs through the process of primary socialization. According to this theory, humans tend to look at health and behaviour on the basis of threat perception (that is, one's perceived susceptibility to illness and the anticipated severity of the consequences of such an illness) and behavioural evaluation or coping appraisal (that is, a belief that an available course of action will be beneficial and the benefits are weigh more than the costs involved in engaging such behaviours).

    This is why whenever humans feel that the risk of developing an illness is high, they are more likely to adopt recommended prevention behaviours. How an individual reacts also depends on other factors like demographic, socio-psychological and structural variables and 'cues to action'. Cues to action are those stimuli (such as media campaigns, illness of a family member etc) that initiate or trigger one to engage in the desired, healthy actions.

    When this theory is applied to the environmental problems by environmental psychologists, it states that the fear of negative outcomes from bad environmental practices will motivate individuals to adopt pro-environmental practices.

Check Your Progress

6. What is Roger's Diffusion of Innovation Theory?
7. What is the Behavioural Change Model?

2.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Daniel Stokols and Irwin Altman published *Handbook of Environmental Psychology* in 1987.
2. Crowding can affect human behaviour in several ways. It can alter behaviour, negatively affect the sense of morality, increase environmental health problems, lead to social conflict and psychological stress, and increase the risk of occurrence of psychopathology.
3. Scientific method has five basic steps. They are as follows:
    - Make observations
    - Ask questions
    - Formulate a hypothesis

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- Conduct an experiment
- Interpret results and make conclusions

4. A hypothesis is a proposed explanation or an inferable statement that aims to answer the question formulated. It needs to be tested through the method of experimentation.
5. Spot sampling is an anthropological method of observation that is used to record individual's behaviour at random times in a given location; for example, studying the shopping behaviour of adults in a super market.
6. Roger's Diffusion of Innovation Theory aims to focus on the cultural spread of ideas. The process by which an innovation is communicated and spread via various channels over time among the members of a social system is known as diffusion. The willingness of various people to adopt innovation varies. They may be early or late adopters, progressing through various stages.
7. Behavioural Change Model believed that if people were better informed and were more aware of the environmental problems, they would automatically be motivated to behave in an environmentally responsible manner.

2.6 SUMMARY

- Environmental psychology is a multi-disciplinary paradigm which draws a lot from the knowledge of people from other disciplines. It relies on findings of geographers, economists, geologists, policy makers, psychologists, sociologists, anthropologists, educators, etc.
- Environmental psychology believes that environment should be interpreted as a major factor in the development and ongoing conduct of people. In other words, environmental psychology can be defined as the scientific study of the transactions and interrelationships between people and their physical surroundings (including built and natural environments, the use and abuse of nature and natural resources, and sustainability-related behaviour.
- Annual Review of Psychology (Sundstrom et al. (1996) published the historical aspects of environmental psychology while focusing on its current status which is documented in a series of comprehensive reviews. Daniel Stokols and Irwin Altman published *Handbook of Environmental Psychology* in 1987.
- The various aspects of human-environment interactions can be related to the relation between environmental psychology and urbanization, slum environment, crowding, work environment, quality of life, residential environment, etc.

- The scientific method begins with making observations and asking questions. Obviously, questions arise out of curiosity, because people want to learn more about what they are observing. To answer their questions, researchers use the *scientific method*. These methods have five basic steps. They are as follows:
  - o Make observations
  - o Ask questions
  - o Formulate a hypothesis
  - o Conduct an experiment
  - o Interpret results and make conclusions
- To study environment-behaviour relationships, environmental psychologists make use of direct and indirect observation methods. Indirect observation involves studying personal diaries, informants and tracing measures. Direct observation method involves researcher trying to make sense of human-environment interactions by directly observing human behaviour in different environmental settings using various sense organs.
- Behaviour mapping is a method that involves noting the place where a behaviour takes place. Behaviour maps may take the form of charts with check-boxes for potential behaviours.
- Ajzen's Theory of Planned Behaviour states that there are specific factors that drive an individual's behaviour which include beliefs about the likely consequences of an action.
- In Andreasen's Social Marketing Model, marketing strategies and techniques are applied in order to achieve specific behavioural goals for a social good.
- The Social Dilemma System Model is a comprehensive model that explains how decision making is influenced by a variety of factors which further influences the kind of strategies people use to make decisions about cooperation.
- Roger's Diffusion of Innovation Theory aims to focus on the cultural spread of ideas. The process by which an innovation is communicated and spread via various channels over time among the members of a social system is known as diffusion.
- Primitive Models were based on the assumption that educating the public on various ecological and environmental issues could bring about a desired change in human behaviour.
- Behavioural Change Model believed that if people were better informed and were more aware of the environmental problems, they would automatically be motivated to behave in an environmentally responsible manner.

- Reasoned/Responsible action theory was proposed by Ajzen and Fishbein, and they believed that human behaviour is grounded in rational thought.
- The Environmental Citizenship Model was proposed by Hungerford and Volk. They gave three stages of educational involvement ranging from first exposure (entry) to real involvement (empowerment), and then suggested that each stage had certain knowledge and attitude characteristics.
- Health Belief Theory proposes that beliefs help shape behaviour. People acquire beliefs through the process of primary socialization. According to this theory, humans tend to look at health and behaviour on the basis of threat perception and behavioural evaluation or coping appraisal.

2.7 KEY WORDS

- **Urbanization:** It refers to the population shift from rural to urban areas, the decrease in the proportion of people living in rural areas, and the ways in which societies adapt to this change.
- **Hypothesis:** It is a proposed explanation or an inferable statement that aims to answer the question formulated. It needs to be tested through the method of experimentation.
- **Behaviour mapping:** It is a method that involves noting the place where a behaviour takes place. Behaviour maps may take the form of charts with check-boxes for potential behaviours.

2.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Write a short note on the history of environmental psychology.
2. What is the main focus on environmental psychology?
3. Briefly mention the steps of the scientific method used in environmental psychology.
4. Write a short note on Health Belief Theory.

Long-Answer Questions

1. Discuss the scope of environmental psychology.
2. Explain the key methods used by environmental psychologists to study human-environment interactions.
3. Analyze the theories and models of environment-behaviour relationship.

2.9 FURTHER READINGS

Nagar, Dinesh. 2006. *Environmental Psychology.* New Delhi: Concept Publishing Company.

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Gifford, Robert. 1997. *Environmental Psychology: Principles and Practice.* Boston: Allyn & Bacon.

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UNIT 3 ENVIRONMENTAL PERCEPTION AND COGNITION

Structure

3.0 INTRODUCTION

Environmental perception is concerned with an individual as well as a group's understanding of their environment and the influence of the environment on decision making abilities. There is a marked difference between geographical environment and behavioural environment. While the former refers to the physical environment, the latter refers to the individual's perception of that environment. This unit will discuss in detail the theories relating to spatial cognition. Spatial cognition is concerned with the acquisition, organization, utilization, and revision of knowledge about spatial environments. The impact of personal space on environmental behaviour will also be highlighted in the unit.

3.1 OBJECTIVES

After going through this unit, you will be able to:

- Understand the concept of environmental perception
- Discuss the theories relating to spatial cognition
- Describe the importance of environmental values and attitude
- Explain the relationship between personal space and built environment

3.2 ENVIRONMENTAL PERCEPTION

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Environmental perception is the study of both individual and group's understanding of the environment, the creation of those understandings, and its impact on decision making. It tries to study the psychology of perception with a very specific interest in the spatio-physical characteristics of the environment.

According to environmental psychologists, the physical environment is only what appears through perceptual experience. They see perception as a psychosocial phenomenon, where our perception of the environment is guided by cognitive and affectionate processes. They see environmental perception as a multi-layered concept that is linked to a socio-environmental perspective. Thus, the study of environmental perception unites elements that contribute to:

- Understanding human-environmental interaction
- Providing data for favourable man-environmental cohabitational organization
- Planning environment educational acts

Koffka (1935) saw geographical and behavioural environment as two different things, wherein geographical environment referred to the physical environment that exists in reality and behavioural environment referred to the concept of environment as perceived by the person. He added that behavioural environment is more relevant than geographical environment when it comes to describing human behaviour.

Unlike Koffka, Gestaltists believed that all human beings perceive the geographical environment in the same way as all individuals carry innate neurological mechanisms which tend to ensure the correspondence between the two types of environments.

Different theories have been put forward to explain the concept of environmental perception. They are as follows:

Brunswik's Probabilistic Theory

Egon Brunswik saw perceptual process as a process of utilization of cues or information coming from the environment. He added that when an individual faces ambiguities and inconsistencies of sensory cues from the environment, he must construct a repertoire of probabilistic judgements about it. In the process, he takes on the task of sampling environmental cues originating from the variety of existing environmental conditions. In such a situation, the individual tends to check the accuracy of the probabilistic judgement by facing the consequences. Thus, to make a better sense of the environment, both the ecological environment and the active role played by human beings assumes importance.

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Gibson's Ecological Theory

According to James J. Gibson, the perceptual phenomenon should be considered as the direct result of ecological or physical characteristics of environment. He added that we should look at perceptual stimuli not in a molecular but a molar sense. He stated that molar experience is represented by what an organism is responding to, and not by what excites an individual's sensory receptors. In this sense, he saw perception as a holistic thing, where special emphasis is given to the meaning of perceptions than visual perception of simple stimuli or geometric configurations. He saw perception to be a mental rather than a physical process. He also believed that we must perceive in order to move, and we must also move in order to perceive.

When it comes to perceiving the environment, human beings tend to look for significant patterns of environmental stimuli rather than seeing environment as separate points of stimuli. Perception is seen to have an adaptive function as external world is seen to provide information capable of guiding the relative adaptive behaviours in a functional way.

The Transactional School

This school believes that physical reality or the environment is considered as a result or a product and not as the cause of perception. That is why, they say that there is nothing called as the absolute objectivity and clear boundaries between the percept and object are not seen. On the contrary, perception is seen as a functional probability of constructs that emerge from the consequence of past action and facilitates the purposes of a human through action. This perspective believes that a human can only know that aspect of external world that is directly relevant to carrying out his or her purpose. Thus, according to Kilpatrick (1961), each man's perceptions are therefore his own, unique and personal.

3.2.1 Spatial Cognition

Spatial cognition is concerned with the acquisition, organization, utilization, and revision of knowledge about spatial environments. These capabilities enable individuals to manage basic and high-level cognitive tasks in everyday life. Several theories have been put forward to explain the concept of spatial cognition. They are as follows:

Field Theory and Psychological Ecology

According to Kurt Lewin (1890-1947), spatial cognition is a method of analysing causal relationships and building scientific constructs as a way of explaining or understanding behaviour with respect to the situation in which it occurs. In this regard, environmental psychologists are interested in the study of the person, the psychological environment as it exists for the person and various aspects of the physical and social world which affect and do not affect the life of the person at that time.

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The 'Channel Theory' and the Psychology of the 'Gatekeeper'

According to this theory, cultural habits of humans are supported and explicated through several objective directions called as channels. For example, the buying channel and the gardening channel are two channels through which food reaches our table.

Within these possible channels, there are people, defined as 'gatekeepers', who have the function of controlling access to several passages. They decide which channel they will enter or move across to fulfil their basic needs. Therefore, it is important to understand the various psychological factors that influence the person who eventually control these channels. For example, house wives are more likely to buy food as compared to husbands. This theory emphasizes on understanding the psychology of the gatekeeper with respect to their cognitive structures, motivation, etc. as they decide which channel is more appropriate for them or which channel would they like to choose the most.

Ecological Psychology

According to Barker, the behaviour setting includes a particular pattern of behaviours and certain spatial-temporal characteristics concomitant with these behaviours. It includes the person behaving within it, but is presented essentially as a supra-individual unit, capable of providing stability and homogeneity to individual behaviours beyond the variety of the individuals participating in the setting. For instance, irrespective of individual differences people at church behave in the same way.

According to this theory, the various settings are distinguished in relation to the optimal or non-optimal amount of people who are part of it. For instance, settings with less than the optimal amount of occupants are defined as undermanned settings and considered as having specific characteristics compared to those populated by an optimal amount of people.

Urie Bronfenbrenner's Ecological Approach

According to him, to better understand human development, one must go beyond the direct observation of human behaviour, occurring at a particular place and should instead focus on multi-person systems of interaction. This is because the latter takes into account aspects of the environment beyond the immediate situation containing that human.

It sees ecological environment as containing several structures, namely, microsystem, mesosystem, exosystem and macrosystem.

The microsystem refers to the complex relationships existing between the person and the environment in which one acts or performs various activities for a particular period of time. The factors of place, time, physical features, activity, participant, and role constitute the elements of a setting. The microsystem is represented by the individual's experience of that setting.

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The mesosystem represents the 'system of the microsystems', as it consists of interrelations between two or more settings, in which the person actively participates. For example, a child interacts in his house, school and in social settings with peers.

The exosystem consists of one or more settings in which events occur that affect or are affected by the person present in that setting. In these settings, the person does not act as an active participant. An example of this will be the parent's place of work, the class of older sibling etc.

The macrosystem refers to consistencies in the form and content of lower-order systems (micro-, meso- and exosystem) that exist, or could exist, at the level of subculture or culture as a whole, along with any belief systems or ideology underlying such consistencies.

The Spatio-Physical Dimension of Behaviour

It deals with the study of dynamic interaction between the dimensions of physical environment and their impact on human behaviour. For instance, it tries to analyse the relations between physical properties of the work environment and levels of productivity. It is believed that by varying the degree and quality of lighting in the environment, correlated variations in the worker's productivity levels would be found.

Check Your Progress

1. What is environmental perception?
2. What, according to Koffka, is the difference between geographical environment and behavioural environment?
3. What is the microsystem?

3.3 ENVIRONMENTAL VALUES AND ATTITUDES

Attitudes tend to explain why individuals behave differently in similar circumstances. But, environmental attitudes refer to tendencies to respond favourably/unfavourably to certain environmental characteristics under study (Stokol, 1978).

To measure environmental attitudes, environmental psychologists often make use of certain measurement instruments such as attitude, scales, etc. They often consider attitudes as expressions of individual satisfaction/dissatisfaction towards the environment (thus focussing on the evaluative component). They also look at attitudes with respect to several important environmental problems such as pollution, limited resources, environmental risk, etc. (thus focusing on the informative component). Stokol found a positive correlation between the attitudes and behaviours people adopt in order to improve their environmental conditions.

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According to Stokol, environmental evaluation is redefined as the congruence people perceive between their own needs and aims and the opportunities offered by the environment rather than a response linearly attributed to the objective properties of the environment in which they live. Several studies have also shown a higher probability of people engaging in responsible behaviour when they are informed about the consequences of pollution.

Janis and Mann (1977), noticed that in the presence of informative uncertainty, human beings have a tendency to avoid information regarding the problem as a way of delegating the responsibility to others. Therefore, they become selective about information (also known as defensive avoidance). Human beings also show another tendency to be open to any type of information, without discriminating its relevance or reliability (Known as hyper-vigilance). Thus, the purpose of discovering what people know about the main environmental problems, and how they perceive and evaluate them is probably more relevant than making predictions about behaviour.

In order to better understand why individuals behave in certain ways, it is important to go beyond their responses and to consider the role played by the social dimension and the degree to which implicit cognitive representations of that attitude are shared between individuals belonging to the same social group (Jaspars and Eraser, 1984).

3.3.1 Attachment and Identity

The increasing interest in cognitive, affective and motivational factors has revealed the complex nature of the relationships between individuals and their socio-physical environment. It highlights how human-beings and the physical environment around them share an inter-dependent relationship with each other. Human beings at times associate their personal identity with the physical environment and its properties. This happens because places in which humans live carry out a very important role in satisfying the biological, psychological, social and cultural needs and thus end up giving more meaning to life.

Research has shown that the deterioration of the neighbourhood, frequent change of residence and technological transformations of the surrounding landscape can have a significant impact on the identity of an individual. Thus, the concept of place identity refers to the idea of personal attachment or rootedness as the individual feels attached to a place. Neisser defines it as ‘the ecological self’.

The structure of place identity is described as a grouping of cognitions regarding a complex of physical setting related clusters of cognitions in which component cognitions of a given cluster are related to each other, and also, to a greater or lesser degree, to the component cognitions of other clusters. Serving as cognitive reference points for comparisons between old and new, between what is known and what is perceived, place identity functions as a framework for the positioning of the various places and respective properties within broader and

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known categories. In this way individuals are assisted in maintaining a sense of continuity of their own self over time, even when environments around them change. Individuals thus develop symbolic and affective associations with various parts of the physical environment.

The concept of place identity also refers to variations in the social values, meanings and ideas which underlie the use of those spaces with respect to social roles and social attributes different groups of individuals in our society make. The conceptualization of place identity refers to the experience that the individual lives in terms of 'continuity of the self, over time and space, and of one's possibility of intervening autonomously (even if in a limited way) in the environment and the events in any given moment'. In addition, certain types of identities are defined as products of specific social structures.

3.3.2 Appraisal and Assessment

Environmental psychologist have often been interested in studying qualitative characteristics of the environment as they are closely related to an individual's sense of satisfaction and well-being which is quite subjective in nature and tends to differ from one person to the other. A person's preference for an environment is likely to be quite different from a person's evaluation of a particular environment.

The term 'environmental appraisal' refers to an individual's personal preference with respect to their physical environments, whereas the term 'environmental assessment' is concerned both with the objective evaluation of qualitative standards of various types of environments and the judgments people make about them.

Environmental psychologists try to measure the quality of environment as a function of the fundamental needs for the well-being of human beings who live in their environments. This assessment of the quality of environment has led researchers to focus on the practical needs of management and environmental planning and hence forth make modifications in one's natural and built environment. While making these evaluations, environmental psychologists focus on the physical and social dimensions of the environment.

Craik has identified five main types of environmental characteristics that have measurable qualities. They are as follows:

(a) Physio-spatial properties
(b) The types and quantity of artefacts present in the environment (from room furnishings to machines in an industrial environment);
(c) The typical traits of various types of environments (from those concerning the panoramic dimension of natural landscapes to office or home environments)
(d) The functional aspects of various environmental settings (with respect to the individual's usual behaviours in them); and

(e) The institutional aspects of the social climate (with particular reference to hospital environments).

Research on the physical dimensions of the environment has tried to study the impact of office quality, effect of water, air, noise, etc. on human behaviour and their psychological functioning and well-being.

Research on the social dimensions of the environments is largely directed towards the study of the interpersonal climate in organizations or institutional environments. For example, they have tried to study the quality of housing and the neighbourhood, availability of residential care facilities, etc. on overall well-being of an individual. Environmental psychologists also try to make predictions about the impact of both technological and social interventions made in the environment on specific communities.

Environmental psychologists try to study various environmental qualities such as:

(a) Coherence: It refers to the ease with which an individual can cognitively organize the physical environment in which they live.

(b) Complexity: It refers to the ability of the environmental setting to keep the person active.

(c) Legibility: It refers to the clarity of the physical disposition which makes it easy for an individual to explore the environment effectively.

(d) Mystery: It refers to that aspect which encourages discovery and greater interaction with the environment.

Human beings tend to respond to their environment in affective ways. In order to accurately evaluate the environment, it is essential to understand the connection between the affective and cognitive dimensions of the environment.

One also needs to keep in mind that one's affective and cognitive evaluation of the environment are influenced by various environmental variables. These variables can be physical properties and individual's personality characteristics which result in the production of a behavioural schema, (this makes an individual either approach or avoid certain environments) or more specific schemas concerning work performance and non-verbal communications.

Kaplan believed that people's environmental preferences must be considered as a matter of 'decision-making and 'choice'. The cognitive processes of categorization and inference play a primary role in the structuring of affectively connoted evaluations, and this further affects the actions people take in their environment.

Thus, one can say that the concept of place outlines a complex unit of analysis that emerges from the interaction between three main components of a specific human-environmental setting, namely, its physical attributes, the activities persons carry out there and the cognitive representations individuals make of both

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the various attributes of the physical environment and the activities they engage in that environment. Human beings tend to positively evaluate those environments that help fulfil or satisfy an individual's need by providing correct opportunities. Here, one sees an intersection between the motivational dimension and the perceptual-cognitive dimension of human-environment interaction.

3.4 PERSONAL SPACE

Personal space refers to the space immediately surrounding the person. Sommer (1969) defines it as 'invisible boundaries surrounding a person's body, into which intruders may not come'. It primarily deals with the boundaries of the spatial area humans maintain while coming in contact with others and the spatial distance they maintain while interacting with each other.

A significant degree of variation in an individual's personal space is seen in different environmental settings and this seems to be affected by various situational and relational factors. Research has shown that people tend to maintain greater distance both when the physical space of the environment is very tight and when individuals interact within 'competitive', rather than 'cooperative' environment. This highlights the interpersonal aspect as the concept of personal space exists only in the presence of an interaction between at least two persons.

Hall (1959) was primarily interested in studying the functions and meaning of the space people interpose between themselves while engaging in everyday interactions. He believed that distance gives information about the qualitative characteristics of an ongoing interaction to the participants as well as to the external observer. It, therefore, involves the behavioural and cognitive components of interaction.

The use of space in regulating interpersonal distance serves the purpose of balancing the contrasting desires of entering into contact with/avoiding the other person. The concept of personal space also gets affected to a greater degree by cultural factors. Hall (1966) gave a typology of 'zones or spaces of interpersonal distance consisting of intimate, personal, social and public space'. In addition, cognitive processes have been seen to play an important role in defining personal space.

Environmental psychologists have tried to study the relationship between personal space and the built environment, primarily with the objective of identifying the optimal disposition for furnishing in that type of environment; they also try to verify which objective disposition constitute the most adequate solution for facilitating the maintenance of personal space and/or for predisposing the possibility of regulating the interpersonal distance between the respective users.

Similarly, Osmond (1957) was mainly interested in the identification of the characteristics of the built environment that favour or inhibit social interactions. He coined the terms 'sociopetal/sociofugal to recognise environments in which the

physical disposition of the functional furnishings (for example, the placement of seats) provides or does not provide individuals with opportunities for interpersonal contact (sitting in front of someone or, vice versa, sitting behind someone).

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Research has noticed significant variations in interpersonal distance with respect to an individual's personality traits, sex, age and status. It has been seen that people tend to enlarge their personal space to increase the importance of interpersonal distance, both with increase in age, in degree of personal coldness and in situations of unequal social status. With respect to gender, males are more inclined to maintain wide personal space, primarily in interactions with persons of the same sex as compared to women (Lott and Sommer, 1967) but a significant degree in the distance was seen when men tended to interact with persons of opposite gender.

In fact, Altman (1975) stated that the relations found between personal space and gender seem to reflect differences linked more to the different socialization of the two sexes than to characteristics of a biological nature. Therefore, it is reasonable to expect that different tendencies may be found in different socio-cultural contexts.

3.4.1 Territoriality

Territory is defined as the complex spatial unit. It tries to study the type and degree of links that are established between persons and the different parts of the environmental space. Sommer defined territory as a geographical area that is personalized or marked in some way and that is defended from encroachment.

Environmental psychologists have tried to study the adaptive function of human territory and have focused on human behaviour with respect to how humans maintain control over their territory and or defend it from intrusions and violations (Craik, 1973). In fact, anthropologists were the first ones to emphasize the social, cultural and religious meanings with respect to territory and human analysis of territorial behaviours.

Pastalan (1970), pointed out that one should also focus on a person's psychological identification with a place and the attitude of possessiveness and arrangement of objects in an area one symbolizes. He emphasized the way in which places and things become part of a person's identity and the social processes.

In 1972, Oscar Newman came in with the concept of 'defensible space'**.** He believed that a decrease or increase in violation of territory is closely related to the presence of real and/or symbolic barriers. However, Taylor et al (1984), believed that a greater sense of safety is associated with how well the territory is represented in their mind cognitively and how homogenous they see the population to be in that territory.

Environmental psychologists have also tried to investigate the differences territorial behaviours can assume in relation to variables such as culture, gender and composition of social groups occupying a certain space. For instance, it is

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seen that the concept of territory is more restricted and limited for the Greeks than for the Americans. A research by Mercer and Benjamin (1980), showed that males have a tendency to define their own territory through much larger spaces as compared to females. Similarly, a study was conducted on Israeli families by Sebba and Churchman (1983), in which it was found that even though husband and wife share the house as a common territorial unit, women tend to identify the kitchen as their own territorial space, thus further highlighting the close interconnection between human territoriality and socio-cultural factors. Therefore, it is essential to look at relationship between people and their territories both in the cognitive and emotional sense.

Keeping in mind the attachments people develop towards objects based on the symbolic-evocative function, Altman specified three types of territories:

- **(a) Primary territory:** It refers to the living space of people and is occupied by them for a long period of time, such as home.
- **(b) Public Territory:** It refers to the space of a seat on a bus or at a reading table in a library. It occupies a less central psychological space and is occupied by the people for a shorter duration of time. It is also open to access by a large number of people. For example, environment of private club.
- **(c) Secondary Territory:** It is characterized both by less psychological centrality for users (compared with primary territories) and by more limited accessibility (compared with public ones). Moreover, the duration of stay in these does not depend so much on individuals as on the community which has control over these territories through possession.

3.4.2 Privacy

Altman defines privacy as the selective control of access to the self or to one's group that individuals tend to practise with respect to the surrounding environment. In Anglo-Saxon cultural tradition, the term privacy emphasized conditions of closure towards others. In other words, it refers to the desire to keep information regarding one's private life reserved.

Russell and Ward (1982) see the term privacy associated with the concept of solitude, anonymity, intimacy, secrecy and reserve. Environmental psychologists have been more interested in the study and measurement of the more strictly motivational and evaluative aspects (needs, expectations, values, etc.) that individuals associate with privacy.

The concept of privacy in the office environment deals with checking out the adequacy of the physical setting with respect to the occupants needs. Privacy at work place has been seen to be associated with the idea of greater satisfaction at work place. Similarly, a greater degree of dissatisfaction has been found to be

associated with increasing visibility and the reduction of the possibility of communicating without being heard by everyone.

On similar lines, Ahrentzen and Evans (1984), have tried to study the relations emerging between degree of teacher satisfaction in their work with the class and different types of physical classroom structures. The key aim behind these studies is to find out more suitable environmental solutions for satisfying the privacy needs of people.

Both personal space and territorial behaviours are assumed by Altman to be mechanisms used by individuals primarily to regulate privacy, that is, to maintain their openness/closedness towards others at optimal levels. Altman sees regulation of privacy as extremely dynamic in nature and is primarily correlated with contexts and situations. He even came up with a new theory of privacy and through it he reformulated the concept of openness or closeness. He saw privacy as not only a mechanism which guarantees the attainment of an ideal state of openness/closedness towards others, but rather a process; its dynamics and outcomes are strictly correlated with the specificity of the 'contexts and social circumstances'.

Check Your Progress

4. What is environment appraisal?
5. What is environmental assessment concerned with?
6. Define privacy.

3.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Environmental perception is the study of both individual and group's understanding of the environment, the creation of those understandings, and its impact on decision making. It tries to study the psychology of perception with a very specific interest in the spatio-physical characteristics of the environment.
2. Koffka saw geographical and behavioural environment as two different things, wherein geographical environment referred to the physical environment that exists in reality and behavioural environment referred to the concept of environment as perceived by the person.
3. The microsystem refers to the complex relationships existing between the person and the environment in which one acts or performs various activities for a particular period of time.
4. The term 'environmental appraisal' refers to an individual's personal preference with respect to their physical environments.

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5. 'Environmental assessment' is concerned both with the objective evaluation of qualitative standards of various types of environments and the judgments people make about them.
6. Altman defines privacy as the selective control of access to the self or to one's group that individuals tend to practise with respect to the surrounding environment. In other words, it refers to the desire to keep information regarding one's private life reserved.

3.6 SUMMARY

- Environmental perception is the study of both individual and group's understanding of the environment, the creation of those understandings, and its impact on decision making. It tries to study the psychology of perception with a very specific interest in the spatio-physical characteristics of the environment.
- Koffka (1935) saw geographical and behavioural environment as two different things, wherein geographical environment referred to the physical environment that exists in reality and behavioural environment referred to the concept of environment as perceived by the person.
- Egon Brunswik saw perceptual process as a process of utilization of cues or information coming from the environment. He added that when an individual faces ambiguities and inconsistencies of sensory cues from the environment, he must construct a repertoire of probabilistic judgements about it.
- Spatial cognition is concerned with the acquisition, organization, utilization, and revision of knowledge about spatial environments. These capabilities enable individuals to manage basic and high-level cognitive tasks in everyday life.
- According to Kurt Lewin (1890-1947), spatial cognition is a method of analysing causal relationships and building scientific constructs as a way of explaining or understanding behaviour with respect to the situation in which it occurs.
- According to the Channel theory, cultural habits of humans are supported and explicated through several objective directions called as channels. For example, the buying channel and the gardening channel are two channels through which food reaches our table. It is important to understand the various psychological factors that influence the person who eventually control these channels.
- According to Urie Bronfenbrenner, to better understand human development, one must go beyond the direct observation of human behaviour, occurring at a particular place and should instead focus on multi-person systems of

interaction. This is because the latter takes into account aspects of the environment beyond the immediate situation containing that human.

- Attitudes tend to explain why individuals behave differently in similar circumstances. But, environmental attitudes refer to tendencies to respond favourably/unfavourably to certain environmental characteristics under study.
- Janis and Mann (1977), noticed that in the presence of informative uncertainty, human beings have a tendency to avoid information regarding the problem as a way of delegating the responsibility to others. Therefore, they become selective about information (also known as defensive avoidance).
- Research has shown that the deterioration of the neighbourhood, frequent change of residence and technological transformations of the surrounding landscape can have a significant impact on the identity of an individual. Thus, the concept of place identity refers to the idea of personal attachment or rootedness as the individual feels attached to a place.
- The term 'environmental appraisal' refers to an individual's personal preference with respect to their physical environments, whereas the term 'environmental assessment' is concerned both with the objective evaluation of qualitative standards of various types of environments and the judgments people make about them.
- Personal space refers to the space immediately surrounding the person. Sommer (1969) defines it as 'invisible boundaries surrounding a person's body, into which intruders may not come'. It primarily deals with the boundaries of the spatial area humans maintain while coming in contact with others and the spatial distance they maintain while interacting with each other.
- The concept of personal space also gets affected to a greater degree by cultural factors. Hall (1966) gave a typology of 'zones or spaces of interpersonal distance consisting of intimate, personal, social and public space'. In addition, cognitive processes have been seen to play an important role in defining personal space.
- Territory is defined as the complex spatial unit. It tries to study the type and degree of links that are established between persons and the different parts of the environmental space. Sommer defined territory as a geographical area that is personalized or marked in some way and that is defended from encroachment.
- Altman defines privacy as the selective control of access to the self or to one's group that individuals tend to practise with respect to the surrounding environment. In Anglo-Saxon cultural tradition, the term privacy emphasized conditions of closure towards others. In other words, it refers to the desire to keep information regarding one's private life reserved.

3.7 KEY WORDS

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- **Environmental perception:** It is the study of both individual and group's understanding of the environment, the creation of those understandings, and its impact on decision making.
- **Personal space:** It refers to the space immediately surrounding the person. Sommer (1969) defines it as 'invisible boundaries surrounding a person's body, into which intruders may not come'.
- **Privacy:** It refers to the desire to keep information regarding one's private life reserved.

3.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Write a short note on Brunswik's Probabilistic Theory.
2. What do you mean by ecological psychology?
3. What, according to Craik, are the five main types of environmental characteristics?
4. Briefly mention the three types of territories identified by Altman.

Long-Answer Questions

1. Explain with the help of theories the concept of spatial cognition.
2. Discuss the concept of place identity.
3. Analyze the relationship between personal space and the built environment.

3.9 FURTHER READINGS

Nagar, Dinesh. 2006. *Environmental Psychology.* New Delhi: Concept Publishing Company.

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UNIT 4 ENVIRONMENTAL STRESS AND HEALTH

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Structure

4.0 INTRODUCTION

There are innumerable causes of stress on the environment. These stressors can be temperature, pollution, noise, etc. Environmental stress has a huge impact on the evolutionary and ecological processes. Environmental stress psychology focuses on the individual's response to the physical, biological, and chemical stressors. This unit will be discuss in detail the environmental stressors and its impact. The effects of physical environment on health will also be explained.

4.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain environmental stress
- Discuss environmental stressors and their effect
- Examine the effects of physical environment on health

4.2 ENVIRONMENTAL STRESS

Environmental stress is the response of humans and animals to physical, chemical and biological structures of environment. The environmental stress includes contact with natural disasters, electromagnetic radiation, pollution, climate change, or noise. These stressors also include pathogens that attack our bodies causing a stressful response. The stressors strain our mind and body irrespective of exposure. Our

body's response ranges from short-term fight-or-flight response to long-term changes to health.

A Brief History of Stress Research

Hans Selye defined the term stress in 1950 as 'the non-specific response of the body to any demand'. Later, other scientists explored this concept further. For both humans and animals, stressors possibly include predators, the accessibility to nourishment, illness, or fluctuations in the setting in which we are living. Apart from that, humans experience threats, relationship issues, work concerns, and more. Environmental stress psychology focuses on how individual's cognitive (mental) wellness responds to physical, biological, and chemical stressors.

Five types of environmental stress

Physical environmental stressors faced by military personnel are as follows:

- Temperature (heat or cold)
- Noise
- Altitude
- Chemicals
- Workplace environments in which injuries or death may occur.

Causes of environmental stress

Environmental stressors include biotic factors such as food availability, the presence of predators, infection with pathogenic organisms or interactions with conspecifics, as well as abiotic factors such as temperature, water availability and toxicants.

Why is environmental stress important?

According to the data obtained from natural populations during the 1940s and 1950s by Drosophila researchers like Timofeeff Ressovsky, environmental stress can be considered as a force shaping adaptation and evolution in fluctuating environments. It is a property of both the stressor and the stressed. Environmental stress has significant impact on the evolutionary and ecological processes. These processes affect and shape the genetic structure and progression of population.

Environmental Stressors and their Effect

In this section, we will discuss environmental stressors such as temperature, chemical pollution and noise.

Temperature has a direct effect on everyone. Individuals face changes in temperature throughout the year. These changes are natural as well as artificial (heaters and air-conditioners). Temperature can affect the mind and body in different ways. Extreme temperatures, whether hot or cold, can put physical demands on the body. It affects the routine of schoolchildren as it can lead to less participation

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in a classroom due to high temperature. High temperature results in decreased attention span and increased cognitive interruptions.

Another stressor is chemical pollution. Introduction of pollutants into land, air, or water system that has a serious biological impact on living organisms is known as chemical pollution. According to Laurance, chemical pollution might have affected millions of children round the globe. This is what scientists are calling a 'silent pandemic'. The world is bathing in a soup of industrial chemicals, which are damaging the intellectual potential of the next generation and may increase the incidence of conditions such as Parkinson's disease. One in every sixth child has developmental disabilities, such as autism, attention deficit disorder or cerebral palsy, the effects of which may be lifelong.

Noise is another harmful stressor. It is known as any unwanted sound. Considered as a pollutant, noise is a potential deterrent to typical interactions with one's environment. For instance, at home, this could be the sound of children playing and laughing too loud, the television and radio going at the same time, or the noise of all the appliances running in the kitchen. A child trying to do homework with all the sounds around him would have a harder time completing the assignment than if the house or room were silent.

Thus, plans to manage such environmental stressors like temperature, chemical pollutants, and noise are necessary to prevent major health problems.

4.2.1 Crowding

According to Stokols (1972), crowding happens when requirement for space exceeds the available supply. An equivalent density level may be seen as more crowded or less crowded because of difference in culture, personality, gender and age or this can be due to situational factors like temporal duration, activity, private versus public space. Because of crowding, it is difficult to regulate social interactions. It sets limit in behavioural options and leads to invasions of personal space. Studies indicate that crowding raises physiological stress: the longer the people experience crowding, the greater the elevations. For example, crowding elevates blood pressure and stress hormones.

Response to crowding can be studied in terms of gender. Men show stronger physiological reactions to crowding than women. Males are more likely to experience high blood pressure as compared to females. Hypothetically, gender differences in reactions to crowding could stem from men having larger personal space zones than women, or these differences could be due to men having less affinitive tendencies, and thus less tolerance for crowding, than women.

People experience psychological stress: they show damaging affect, tension, anxiety and nonverbal signs of nervousness (fidgeting or playing with objects repeatedly). Crowding is associated with social withdrawal, reduced eye contact, greater interpersonal distancing and inhibition in starting a conversation. When people cope with crowding by withdrawal, they unintentionally damage social

support; thus it reduces resources to deal with other stressors which may translate to amplified risks for psychological well-being.

4.2.2 Noise

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Noise refers to unwanted sound. It is typically characterised by intensity (e.g. decibel), frequency (e.g. pitch), periodicity (continuous or intermittent) and duration (acute or chronic). Sound is necessary but not adequate to produce noise. The psychological and physical components of sound play a dominant role in perceiving noise. Intense, unpredictable and uncontrollable noise create negative feelings like irritation and annoyance.

Chronic noise produces physiological stress. Another source of noise is worksites. Individuals working in loud places, have higher blood pressure as compared to individuals who live in quite places. Noise damages people at psychological and behavioural level. It interferes with performance and it may alter the ability to pay attention. It can also damage memory.

Noise affects motivation. Individuals exposed to noise have a less motivation as compared to people who work in quite places. When individuals were able to control noise, the aftereffects were mitigated. Exposure to other uncontrollable environmental stressors such as crowding and traffic congestion creates similar motivational deficits.

4.2.3 Overpopulation

Population is growing at an unprecedented rate, outdoing the ability of Earth to support it. Overpopulation is a situation in which population in a given area is so massive that it puts a stress on the well-being of the people and leads to their suffering. It is associated with adverse environmental and economic outcome, ranging from over-farming, deforestation, and water pollution to eutrophication and global warming.

Overpopulation is a strain on the environment because the population is more than the carrying capacity of the planet. This leads to a fight for existence as people scramble for food and other resources.

Overpopulation affects environment negatively due to overuse of natural resources and production of waste material. It is associated with environmental stressors like loss of biodiversity, air and water pollution and amplified pressure on land. Population size and rate of growth of population plays a major role in environmental change. Growing population and consumption of natural resources are fundamental drivers of human-environment impact. In the case of human and environment, per capita income and per capita energy consumption have been measured. Thus, it is evident that population growth is a great threat to the world's environment. Each individual requires energy, food, space and resources to survive, which results in environmental losses.

Causes of Overpopulation

Overpopulation is credited to trends stemming from a sudden increase in birth rates in the 20th century. Because of good medical facilities, people are living longer. It also results from migration in some specific areas.

4.2.4 Effects of Physical Environment on Health

Ninety percent of the time, we are indoors, where we live, work, relax, and learn. This deeply impacts our health, well-being, and productivity. The Centres for Disease Control and Prevention determined that our physical and social environment affects over 50 percent of our health. Lifestyle, health behaviours, medical care, and genetics also play a major role. Given below are the effects of poor physical environment:

- Loss of Fresh Water
- Species Extinction
- Lower Life Expectancy in the Fastest Growing Countries
- Depletion of Natural Resources
- Increased Emergence of New Epidemics and Pandemics
- Less Freedom, More Restrictions
- Increased Habitat Loss
- More Intensive Farming Practices
- Increased Global Warming and Climate Change
- Elevated Crime Rate

Physical Environment Stress

Physical environmental stressors include light, colour, etc. Too much sunlight or too little/no sunlight, can both serve as stressors. People living in northern latitudes, without much sunlight exposure may experience *seasonal affective disorder* (sadness and 'blues') during winter. Artificial lights, (LED, blue and fluorescent) used in many work environments can stress our minds and bodies.

The modern man uses minimal light during the night, which affects the body's circadian rhythms and lowers levels of melatonin (sleep hormone). As per researchers, blue light in the evening is detrimental to health.

Ancient Chinese system of *fengshui* believes that the way you organize items in your home or work affects your life and health; colours play an important role in this system. Practitioners believe that reorganising the space and experimenting with colours brings better health and prosperity. This also helps in improving mood and harmony. It increases the positive energies and vibrations and reduces the negative vibrations. This practice also balances the five elements (fire, earth, metal, water, and wood). These practices are actively used in hospitals

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to improve health outcomes and patient's mental wellness. In workplaces, these practices improve productivity and attitudes.

Ways to Reduce the Overall Impact of Environmental Stress

- Reduce Contact with the Stressor
- Purify Your Environment
- Build Resilience

How to Manage Environmental Stress

(a) Increase Your Connections to Nature

Some ways to increase your connection to nature are:

- Go for a walk, hike, kayak.
- Ground yourself; walk barefoot on the grass or bare soil.
- Have more houseplants within home or office.
- Get a pet.
- Play nature sounds in your home or listen to them at work.
- Watch documentaries on nature.
- Create an aquarium/planetarium in your home.
- Put artwork of natural landscape in your home.

(b) Find Ways to Relax

A few techniques that may help you include:

- Meditation
- Take a warm bath with Epsom salts
- Soak your feat in lukewarm water
- Get a massage
- Read a novel
- Unplug from technology
- Try a vacation
- Try aromatherapy with healing essential oils
- Practice in deep breathing exercises
- Use fengshui and colour management to optimize your work and home
- Change UV lights to full spectrum
- Laugh out Loud!

(c) Improve Your Health

A few ideas for improving your health are as follows:

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- Adopt an ordinary healthy lifestyle.
- Start a healthy diet plan.
- Try eating vegan or vegetarian diet.
- Increase intake of stress-relieving foods.
- Get fit and exercise: walk, run, bike, canoe, dance.
- Don't smoke.
- Reduce alcohol intake.
- Improve your flexibility with yoga or Pilates.
- Cleanse or detox your body.
- Get a check-up from a natural health practitioner.
- Take natural supplements for stress relief.
- Make sure you have the vitamins and minerals your body needs.
- Get adequate restful sleep.
- Create artwork, journal, or take up a hobby.
- Avoid worry.

Check Your Progress

1. Define stress.
2. What do scientists refer to as the 'silent pandemic'?
3. Why is overpopulation a strain on the environment?
4. What are the causes of overpopulation?
5. Mention any two effects of poor physical environment.

4.3 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Hans Selye defined the term stress in 1950 as 'the non-specific response of the body to any demand'.
2. Chemical pollution might have affected millions of children round the globe. This is what scientists are calling a 'silent pandemic'.
3. Overpopulation is a strain on the environment because the population is more than the carrying capacity of the planet.
4. Overpopulation is credited to trends stemming from a sudden increase in birth rates in the 20th century. Because of good medical facilities, people are living longer. It also results from migration in some specific areas.
5. The effects of poor physical environment are as follows:

- Loss of Fresh Water
- Species Extinction

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4.4 SUMMARY

- Environmental stress is the response of humans and animals to physical, chemical and biological structures of environment. The environmental stress includes contact with natural disasters, electromagnetic radiation, pollution, climate change, or noise.
- Hans Selye defined the term stress in 1950 as 'the non-specific response of the body to any demand'. Later, other scientists explored this concept further. For both humans and animals, stressors possibly include predators, the accessibility to nourishment, illness, or fluctuations in the setting in which we are living.
- Temperature has a direct effect on everyone. Individuals face changes in temperature throughout the year. These changes are natural as well as artificial (heaters and air-conditioners). Temperature can affect the mind and body in different ways. Extreme temperatures, whether hot or cold, can put physical demands on the body.
- Another stressor is chemical pollution. Introduction of pollutants into land, air, or water system that has a serious biological impact on living organisms is known as chemical pollution. According to Laurance, chemical pollution might have affected millions of children round the globe. This is what scientists are calling a 'silent pandemic'.
- Noise is another harmful stressor. It is known as any unwanted sound. Considered as a pollutant, noise is a potential deterrent to typical interactions with one's environment.
- According to Stokols (1972), Crowding happens when requirement for space exceeds the available supply. Because of crowding, it is difficult to regulate social interactions. It sets limit in behavioural options and leads to invasions of personal space.
- Noise refers to unwanted sound. It is typically characterised by intensity (e.g. decibel), frequency (e.g. pitch), periodicity (continuous or intermittent) and duration (acute or chronic). Sound is necessary but not adequate to produce noise. Chronic noise produces physiological stress. It also decreases motivation.
- Population is growing at an unprecedented rate, outdoing the ability of Earth to support it. Overpopulation is a situation in which population in a given area is so massive that it puts a stress on the well-being of the people and leads to their suffering.

4.5 KEY WORDS

- **Deforestation:** It the removal of a forest or stand of trees from land which is then converted to a non-forest use.
- **Eutrophication:** It is the process by which a body of water becomes overly enriched with minerals and nutrients which induces excessive growth of algae.
- **Global warming:** It is the increase in the temperature of the earth's atmosphere, caused by the increase of certain gases.

4.6 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the various types of environmental stress?
2. Briefly mention the impact of crowding on people.
3. How can environmental stress be managed?
4. What are some of the ways one can increase their connection to nature?

Long-Answer Questions

1. Discuss in detail the different environmental stressors and their impact.
2. Explain the impact of crowding, noise and overcrowding.

4.7 FURTHER READINGS

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BLOCK - II
PROBLEMS AND SOLUTIONS

UNIT 5 WEATHER AND CLIMATE ISSUES

Structure

5.0 INTRODUCTION

Weather and climate can have a significant impact on the mental and physical wellbeing of people. While the term weather is used to describe the condition of atmosphere over a shorter span of time, climate refers to the weather pattern over a long period of time. Studies have shown a strong correlation between changes in weather and climate and the way humans act and behave. In a similar vein, each season impacts people differently. This unit will discuss in detail the natural and technological disasters. The concept of environmental risk perception will also be explained.

5.1 OBJECTIVES

After going through unit, you will be able to:

- Describe the impact of weather and climate on human psyche
- Explain the concept of seasonality and the impact of seasons on mental health
- Discuss in detail natural and technological disasters
- Understand environmental risk perception

5.2 WEATHER AND CLIMATE

Climatology is an atmospheric science which studies climatic change. Weather refers to the condition of atmosphere over a short period of time. On the contrary, climate refers to weather patterns of a place over a long period of time.

Temperature, precipitation, clouds, and wind, are innumerable facets of weather which people experience throughout the day. Hurricanes, tornadoes, blizzards, and droughts are considered as severe weather conditions. These weather conditions have a severe impact on people, agriculture, and ecosystems. The weather conditions occur in the lowermost layer of the atmosphere.

Weather changes within minutes/hours, but climate change takes decades and centuries. The climate is demarcated not only in terms of average temperature and precipitation but also by the type, frequency, duration, and intensity of weather events such as heat waves, cold spells, storms, floods, and droughts.

There is a great confusion between climate and weather. We often use the two words interchangeably, but it is important to know the difference. For example, in 2014/2015, a cold and snowy winter was experienced by the eastern United States. This was, however, a short term regional weather phenomenon. It therefore does not negate the rise in national and global temperatures, sea level, or other climate indicators.

The climate-stressors have long-term impact as compared to the major stressors of weather. The climate stressors can last for only a season or be an overall shift, as seen in global climate change. An example of climate stressor could be a summer heat wave which leads to significant increase in temperatures in cities like Seattle where air conditioning units are not typically used.

A fresh report by eco-America and the American Psychological Association, on mental health and climate change, linked climate change to chronic mental health issues. This led to aggression and violence, more mental health emergencies, an increased sense of helplessness, hopelessness, or fatalism, and intense feelings of loss. Electricity accessibility is affected by the changing weather patterns; power-outrages can be dangerous for the elderly or for people who are ill or have less resilience to extreme weather. Around the world, climate change is expected to impact food security along with other basic human necessities.

Impact of weather and climate issues on human psyche

Climate change refers to relatively stable changes in the meteorological parameters like precipitation and temperature over a period of time in a given region. It is a global concern that is known to have a significant effect on both the physical and mental health and well-being of mankind. Global climate change is likely to be associated with spread of vector borne diseases, injuries and deaths due to extreme weather conditions such as floods, storms, and cyclones, thermal injury due to

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exposure to heat, risk of spread of water-borne infections due to floods and coastal water warming, and reduction in regional crop yields leading to malnutrition. In addition, rising temperatures, heat waves, floods, tornadoes, hurricanes, droughts, fires, loss of forest, and glaciers, along with disappearance of rivers and desertification, can directly and indirectly cause human pathologies that are physical and mental in nature.

Research over the years have shown a strong correlation between changes in weather and climate and the way humans act and behave. Some of the key findings in this regard are as follows:

1) Increase in temperature has often been linked to increase in rates of aggression, irritability, crime rate and suicides.
2) Changes in climate are likely to badly affect those societies that are highly dependent on agriculture as agricultural land may get encroached by rising sea levels, flooding, etc. This can significantly affect the agricultural produce and can have a negative impact on the agriculture based industries, thereby resulting in increased unemployment, economic hardships, higher levels of distress, stress, helplessness and increased rate of suicide and crime. Economic constraints, in turn, can also have an adverse impact on healthcare.
3) Prolonged drought is strongly linked with increase in number of farmer suicides as failure of crop can lead to significant financial problems. Drought can lead to increased stress and poor mental health. Nutritional deficiencies in children are also associated with mental health problems like depression and cognitive decline.
4) Occurrence of natural disaster like flood, earthquake, tornadoes, hurricanes, storms, etc. can lead one to develop post-traumatic stress disorder, adjustment disorder, and depression. Some people can also develop chronic psychological illness. Additional consequences of natural disasters are the loss of social support, job insecurity, and loss of belongings, as well as disruption of medical health system, displacement, and relocation. All of these are related to the onset of psychological distress. Mental health disorders are often seen even one year after the disaster or event. Some of the mental health issues that have been seen post disaster are PTSD, physiological hyper-arousal, chronic dissociation, sadness and depression, detachment, disorganized thinking and behavior, numbing or avoidance, poor concentration, and behavioural problems.
5) Floods are known to have a direct impact on human life in terms of morbidity and mortality. It can lead to drowning, electrocution, cardiovascular events, nonfatal injuries, and exacerbation of chronic illness. Floods can also cause waterborne diseases (due to contamination of drinking water), infectious diseases, and psychiatric

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and mental health disorders. Flooding disrupts infrastructure, causing problems for the standard systems of care, including mental health care that could assist and mitigate the psychological outcome for victims.

6) The term 'wildfire' refers to large-scale fires, generally occurring in forests and jungles. Wildfires are seen to have a devastating effect on our ecosystem. For example, once burnt, forest tend to become savannah, scarcely covered by deciduous trees or cultivation. They are also known to have a detrimental effect on one's mental well-being. For instance, it can lead to mental health problems, post traumatic disorders, psychosomatic illness, alcohol abuse, etc.

7) Changes in climate and global warming may force people to migrate to new places, which can lead to acculturation stress. It can also lead to increased rates of physical illnesses and psychological distress. It has been found that people who are forced to migrate are likely to suffer more from psychiatric concerns as compared to people who choose to migrate. This happens more as individuals tend to develop a feeling of connectedness to their environment of residence, which gets uprooted when they are forced to migrate.

8) Heat waves are associated with increase in the occurrence of mental disorders such as mood disorders, anxiety disorders, etc. Poor physical health and ailments can lead to poor quality of life and psychological distress. Environmental determinants such as pollen, smoke, dust, and stagnant water consequent to heat, drought-related fires, and floods are likely to adversely affect human health and lead to chronic physical diseases and poor stress coping mechanism, eventually resulting in occurrence of mental health concerns.

9) Heat stress directly caused by heat waves has been associated with mood disorders, anxiety, etc. Research has shown that people with mental illness were three times more likely to run the risk of death from a heat wave than those without mental illness. During pregnancy, especially in the second and third trimester, it was noted that exposure to heat waves can be associated to a lower average birth weight and increase of incidence of preterm birth.

10) For indigenous populations, deforestation has a deeper impact as it can lead to maladaptive disorders and depression. In general, forests have been considered as a source of health and protection from various types of stress. For instance, children who grow in greener urban areas, show better spatial working memory, improved attentional control and capacity, and higher academic achievement, improved behavioural and emotional development, and positive structural changes in the brain.

11) An individual's work condition can also impact on one's mental health. For example, in places where there are no air-conditioners, an increase in ambient temperatures might lead to decreased productivity in the day time when the temperatures are high. For workers who are paid subsistence rates in developing countries, avoidance of work in excess heat may result in reduced incomes and growing poverty. If they attempt to compensate by extending their work hours, it can impair their family and social relations, leading to reduced buffer for development of mental illness.

12) *Landscape modification* can induce individuals to develop a profound sense of loss of connection and detachment from the environment they know, thus possibly increasing the risks for mental health. It can result in acute and chronic psychopathologic trauma and shock, PTSD, depression, anxiety, suicide, substance or alcohol abuse, aggressiveness and violence, difficulties in social and interpersonal relationships, loss of personally important places, alteration of social ties, loss of autonomy, and control, as well as personal and professional identity, leading to the emergence of feelings of helplessness and fear, and eco-anxiety.

13) Not only the changes in climate but also the way the climate change is represented in media and popular cultures can have a significant impact on the person's stress response and mental well-being.

Climate change affects different people differently

Changes in climate and weather can have a far greater impact on some people compared to others. Children, elderly, pregnant and postpartum women, people with pre-existing mental illness, people who have chronic physical and mental illness, people with cognitive and mobility impairments, people who are economically disadvantaged, migrants, refugees, those who are homeless and first responders to the disaster can all have different responses to changes in climate.

In addition, people living with mental illness are also more likely to live in poverty or to have co-occurring substance use disorders, which make it harder for them to cope or adapt to changes. In addition, those with severe mental illness are more likely to be dependent upon service, infrastructure, and medication supply chains that are often disrupted after disasters.

Children tend to get significantly affected as disruptions in routine, separation from caregivers, evacuations or displacement, and parental stress after a disaster can contribute to increased distress.

First responders, emergency workers and others involved with responding to extreme weather-related disasters are at increased risk for mental health risks both in the short and long term. These individuals, who may both be a responder and victim, are required to provide care for the public while managing the adverse

impacts of a disaster. Responders and emergency workers are often exposed to injury or death in the line of work, which can add to the stress that they experience.

What needs to be done?

Since climate change is known to impact mental health in many ways, it is very important that we take necessary steps to reduce global warming, minimize mitigation of greenhouse gases, etc. One also needs to provide adequate treatment facilities for managing mental health problems and attempts should be made to enhance human resilience and their stress coping capacities. In addition, provision of subsidies and guaranteed income during the drought seasons might lead to less economic and psychological stress on farmers in question. In addition, some of the following steps can be undertaken:

- Pricing or Regulating Carbon Emissions
- Demand Climate Policy
- Educating People
- Demanding Factually Accurate News
- Using Social Media

Check Your Progress

1. What is the difference between climate and weather?
2. State the measures that can be taken to deal with mental health issues resulting from climate change.

5.3 SEASONALITY

Seasonality consists of patterns that are periodic and repetitive in nature, and are generally regular and predictable over a time series. Various factors can lead to seasonality including weather, vacation, and holidays. In a time series, seasonal fluctuations can be contrasted with cyclical patterns. The availability of resources is influenced by seasonal shifts in climatic conditions, which is influenced by the presence or absence of species throughout the environment at both temporal and spatial level. Various factors such as cycles or differences in temperature, hours of sunlight, levels of rainfall and snowfall can result in seasonality.

Research over the years have shown that certain seasons are associated with greater well-being and some have been found to be linked with poor sense of well-being. Both our mental and physical state is significantly affected by the seasonality. For instance, Seasonal Affective disorder is a type of depression that is seen to occur more in the winter months. Similarly, infectious diseases like influenza and allergic conditions like hay fever show a typical seasonal pattern.

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Each season is known to have an impact on our overall mental state. This has been discussed below:

1. **Spring:** It is known to be a time of rebirth, rejuvenation, growth, and blooming. This season tends to make us feel re-energized and is linked to our general overall well-being. Research has shown that people are more positive in spring as compared to the other seasons. These seasonal differences were only seen in the group of high-neurotic participants as subjects who score high on neuroticism tend to attribute their symptoms and unhappiness to the seasons.

   To enjoy greater health benefits, during this season, we must do the following:

   - Go for a mindful walk outdoors in nature: observe the growth and blooming of plants and flowers around.
   - Reorganize and clean your workspace or living area.
   - Get rid of items that are old, expired, or no longer of use to you. Bring in appropriate replacements of new items wherever you see fit. Reorganizing and cleaning in general can be a very therapeutic process.
   - Create a spring music playlist with an up-to-date list of your favourite songs and tunes.
   - Invest in a reusable water bottle, and try to drink more water throughout the day.
   - Go on a picnic with friends or family members.

2. **Summer:** It is seen as a time for adventure, sunshine, outdoor exploration, reflection, and exploration. To enjoy greater health benefits, one can do the following in this season:

   - Immerse yourself in nature and take advantage of the weather by engaging in active exercises – walks, hikes, or runs – outside.
   - Visit the beach or the lake with friends or family. Spending time near bodies of water can naturally elevate your wellbeing.
   - Plan a vacation.
   - Start or continue a journal. Check-in regularly and reflect on how you are feeling.
   - Explore events going on in your community, such as outdoor movie nights, community activities, etc.

3. **Autumn:** It is usually seen as a relatively stressful time, with busier schedules and colder weather. We can do the following things to ensure a better health:

   - Have a warm drink, journal, and reflect on how you are feeling. Consider keeping a gratitude journal.
   - Set boundaries for yourself: prioritize yourself, and do not over-commit to activities as much as possible.

- De-clutter your surroundings, especially if you find yourself spending more time indoors.

4. **Winter season:** It is often seen as gloomy and is associated with a greater risk for various mental health concerns. In order to stay healthy, one can engage in the following activities:
    - Ensure that you are getting enough sleep, as winter can become overwhelming and busy with activities.
    - Rather than 'hibernating' during the winter, keep up your exercise routine from the autumn, or try something new entirely. Even light exercise a few times per week can significantly elevate your wellbeing.

Check Your Progress

3. In which season is Seasonal Affective Disorder most likely to occur?
4. Which season is known as a time of rebirth, rejuvenation, growth, and blooming?

5.4 NATURAL AND TECHNOLOGICAL DISASTERS

Let us first discuss in detail the types of natural disasters.

Natural disasters

Natural disaster is an event, which is caused by the natural forces of the Earth and brings about tremendous damage and loss of life. Earthquakes and tsunamis, floods and volcanic eruptions, mudslides and wildfires are some examples of Natural Disaster.

Natural Disasters List

There are various natural disasters which can be categorised based on specific criteria:

Table 5.1 *Types of Natural Disasters*

Types of Natural Disasters				
Geological Disasters	**Hydrological Disasters**	**Meteorological Disasters**	**Space Disasters**	**Other Types of Disasters**
Avalanche Landslides Earthquakes Sinkholes Volcanic Eruption	Flood Tsunami Limnic Eruption	Cyclonic Storm Blizzard Cold waves Heat waves Drought Hailstorms Tornadoes	Impact Events Solar Flares Gamma-Ray Bursts	Forest fires

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Geological Disasters

Geological disasters are caused due to changes in the earth, either above or below the surface. These can be catastrophic in nature. For instance, volcanic eruptions frequently occur due to the contact between tectonic plates.

Hydrological Disasters

Hydrological disasters are triggered by the change in quality, distribution or movement of water below the surface or in the atmosphere. These changes are sudden and violent in nature. For example, a tsunami, which is caused due to earthquakes or volcanic eruptions under the seabed, involves the displacement of a large volume of water.

Meteorological Disasters

Extreme weather conditions such as rain, snow or drought cause meteorological disasters. The earth's atmosphere and the weather-forming process, are affected by meteorological disaster. This disaster is destructive to the environment and can bring about mayhem. Examples of meteorological disasters include hurricanes, hailstorms and tornadoes.

Space Disasters

Space disasters primarily include solar flares that impact airburst events. These are held responsible for leading to the extinction of all non-avian dinosaurs. A large amount of solar radiation suddenly released by the sun causes Solar flares.

What is the relationship between natural disasters and conflict?

There are several cases of natural disasters where lives of countless people have been disrupted. For example, the Somali government which is extremely weak due to long-standing conflict, has not been able to respond to the drought nor floods which have occurred in the country. If there was an absence of conflict in Somalia, the state and community institutions would have probably dealt with the disasters more effectively.

Even though the situations vary, the occurrence of a natural disaster in an area affected by on-going conflict can lead to:

- Increased wretchedness for people whose lives have already been disrupted by conflict.
- Displacement as people who are displaced by conflict are forced to move yet again because of the disaster.
- Increased hardship on communities hosting the displaced.

Walter Kälin (Secretary-General on the Human Rights), developed Operational Guidelines on Human Rights and Natural Disasters. There are a couple of guidelines that were emphasised:

- People affected by natural disaster should be provided with the same rights and freedom under human rights law as others in their country and should not be discriminated.
- It is the chief duty and responsibility of the States to provide assistance to individuals affected by natural disasters and to protect their human rights.
- Organizations providing protection and assistance should accept that human rights underpin all humanitarian action.
- Communities affected by the disaster should be entitled to have all the information regarding the nature of the disaster they're facing, possible mitigation measures that can be taken, early warning information, and information about ongoing humanitarian assistance.

People affected by natural disaster, face following problems: unequal access to assistance; discrimination in provision of aid; enforced relocation; sexual and gender-based violence; loss of documentation; recruitment of children into fighting forces; unsafe or involuntary return or resettlement; and issues of property restitution. These problems are experienced by those displaced or otherwise affected by conflicts.

Technological disaster

Technological disaster can be defined as a catastrophic event that are caused by either human error in controlling technology or a malfunction of a technology system. Structural collapses of bridges, mines and buildings, and industrial accidents, like chemical or nuclear explosions are included in technological disasters. Examples of long-term manmade disasters consist of the impact of pollution, which include smog, acid rain, etc. The symptoms of such disasters at times, may gradually surface over a few years. At other times, effects may immediately hamper society and business. Federal Government's Disaster Response Agency (FEMA) operates their peculiar Tech Sector Collaboration program to deal with technological disasters.

What are Natural and Technological Disasters?

Natural disasters consist of hurricanes, earthquakes, tornadoes, wildfires, tsunamis, and floods, as well as extreme weather events such as blizzards, droughts, extreme heat, and wind storms. These events lead to many difficulties and problems for children and families, which comprise displacement, loss of home and personal property, changes in schools, economic hardship, loss of community and social supports, and even injury and death of loved ones.

Technological disasters like oil spills, industrial fires, nuclear and hazardous materials accidents, etc. can also lead to deadly exposure that could brutally affect health. It could also augment economic and ecological challenges.

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The Consequences of Natural and Technological Disasters

Families and children who have experienced disasters have severe reactions depending on various factors which include proximity to the event, level of destruction, injury and death associated with the disaster, and secondary adversities post-disaster, such as prolonged separation from parents, multiple moves, and exposure to additional traumas. Many factors like age, gender, socio-economic status, ethnic and racial background, cultural issues etc. can be affected by the vulnerability, resilience, and recovery of children and families. Other challenges may be faced by the children of emergency responders.

Experiencing a disaster results in a variety of short- and long-term trauma-related mental and physical health problems:

- Posttraumatic stress reactions (e.g., PTSD)
- Behavioral and emotional deregulation
- Depression and anxiety
- Substance use disorders
- Suicidal thoughts
- Separation distress and specific fears
- Persistent grief reactions
- Social withdrawal
- Anger and aggression
- Academic decline
- Developmental disturbance (e.g., regression)
- Physical complaints (e.g., headache, stomachache, fatigue)
- Reduced self-care
- Increased risk for acute illness

The Effects of Technological Disasters

Disasters brought about by technology are extremely stressful due to their chaotic, harmful and unpredictable nature. These disasters have an impact on individuals, families and communities on various levels. Many individuals go through lack of income and employment and uncertainty about the future. Some people also undergo serious depression and even post-traumatic stress disorder (PTSD). Societies may experience frustration with public officials, responders and the managers of technology.

Managing Technological Disaster

Technological disasters can be managed by individuals, community, first responders and government. Emergency response plans, communication hierarchies, command structures and public education play an important role in management. By using

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effective modes of communication, collaboration and communication, technological disaster can be handled effectively.

Assisting Children and Families, After Natural and Technological Disasters

Many effective interventions have been developed for children who are exposed to disasters. These measures aim at promoting a sense of safety and establishing healthy inter personal connections. Recovery of children is assisted by maintenance of regularity in family and school routines and uninterrupted support of parents, teachers and other adults. Specific strategies to recover from a natural disaster include teaching problem-solving, stress management, and relaxation techniques; providing education about trauma; and providing appropriate treatment and referrals, where and when necessary.

There are several mental health amenities provided to children in community settings such as schools, disaster shelters, health and mental health care agencies, faith-based facilities, and after-school program locations. Research has suggested provision of an optimal environment by schools in order to enhance access to services, family engagement and completion of the treatment.

Check Your Progress

5. Give some examples of natural disasters.
6. What are hydrological disasters?
7. Mention examples of technological disasters.

5.5 ENVIRONMENTAL RISK PERCEPTION

Risk is said to be an activity, event or situation that has the probability of bringing about adverse outcomes which are uncertain in nature.

- Environmental risks are characterized by high complexity and uncertainty, entailing intricate causal relationships and various outcomes.
- Environmental risks often arise from the accumulated behaviors of individuals (e.g. use of fossil fuels) rather than from a specific activity.
- Environmental risks raise ethical issues. The consequences of environmental hazards are often temporally delayed and geographically distant. People who play a role in contributing to risks (e.g., industrial countries) may not be the ones suffering the consequences (e.g., developing countries, future generations).

Risk perception refers to an individual's specific judgment about the dangers associated with some activity, event or technology. Research has developed numerous techniques to evaluate subjective risk judgments.

1. Respondents are asked to give an overall judgment either by rating or ranking various hazards according to their overall dangerousness.

2. Ask individuals the amount of money they would be 'willing to pay' (WTP) to alleviate a risk or how much they would be 'willing to accept' (WTA) to stand a certain risk.
3. Have respondents guess the subjective probability of a given consequence (e.g. the probability of dying from lung cancer when exposed to asbestos).

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Heuristics and biases in risk judgements

Traditionally, heuristics have been studied in the area of subjective probability estimates. Though Heuristics often brings valid results, it can lead to biased risk assessments. People's tendency to overestimate small frequencies and to underestimate larger ones while judging the frequency of various dangers is an important example.

The anchoring-and-adjustment heuristic is referred to the fact that people while making estimates, start out from a reference point that is salient in the situation (the anchor) and then adjust the first estimate to reach the final judgment. **Framing effects** refer to the finding that different descriptions of otherwise identical problems which can alter people's decisions. It powerfully shapes assessments in the framing of a problem. One common description for framing effects is called loss aversion, which states that a loss is subjectively experienced as more devastating as compared to the gratifying experience of an equivalent gain.

Temporal discounting of environmental risks

Temporal discounting is the psychological phenomenon stating that outcomes in the far future subjectively do not hold as much of significance than the ones in the immediate present. Upon applying the perception of environmental risk, this predisposition implies that environmental risks should be alleged as less severe when the occurrence of the consequences is delayed.

The psychometric paradigm

The psychometric paradigm aims is to identify the 'cognitive map' of diverse hazards, activities or technologies and its fundamental psychological dimensions that lead an individual's perception of the risk level of an event.

- **Dread risk** refers to the degree to which a danger is perceived as dreadful, having severe, catastrophic consequences or being uncontrollable and involuntary.
- **Unknown risk** refers to the level to which the risk is experienced as new, unfamiliar, unobservable or having delayed effects.

Risk, Values and Morality

A central view in environmental ethics maintains that some aspects of the environment (e.g., rare species, landscapes) have an intrinsic value, rendering to which the non-human world should be valued and respected '*for its own sake*', regardless

of subjective opinions. For example, many consider sacrificing nature or endangered species for monetary benefits as being morally wrong.

Morality and ethics

Ethical or moral contemplations also play a crucial role in risk evaluation. They basically imply adherence to principles regarding which behaviours are morally right or wrong. Moral philosophy usually divulges consequentialist and deontological principles (morally mandated actions or prohibitions).

Emotional Reactions to Environmental Risks

Emotions influence the way one views risk. Different emotions can have a different impact on the perception of risk. For example, fear increases and anger reduces risk perception, even though both are considered to be negative emotions. Fear is associated with assessing situations as uncertain and uncontrollable, leading individuals to observe events as more dangerous. Emotions not only affect risk perception; they also result as reactions to apparent risks. When indivduals focus their attention on the consequences of a hazard, they experience consequence-based emotions. Ethics based, other directed emotions (e.g. outrage) are experienced when responsibility can be credited more clearly to an agent (e.g. chemical dumps).

Check Your Progress

8. What do you mean by risk perception?
9. How can fear influence risk perception?

5.6 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Weather refers to the condition of atmosphere over a short period of time. On the contrary, climate refers to weather patterns of a place over a long period of time.
2. Since climate change is known to impact mental health in many ways, it is very important to provide adequate treatment facilities for managing mental health problems and attempts should be made to enhance human resilience and their stress coping capacities.
3. Seasonal Affective Disorder is most likely to occur in winter.
4. Spring is known as a time of rebirth, rejuvenation, growth, and blooming
5. Earthquakes and tsunamis, floods and volcanic eruptions, mudslides and wildfires are some examples of natural disasters.

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6. Hydrological disasters are triggered by the change in quality, distribution or movement of water below the surface or in the atmosphere. These changes are sudden and violent in nature.
7. Structural collapses of bridges, mines and buildings, and industrial accidents, like chemical or nuclear explosions are included in technological disasters.
8. Risk perception refers to an individual's specific judgment about the dangers associated with some activity, event or technology.
9. Different emotions can have a different impact on the perception of risk. For example, fear increases risk perception. Fear is associated with assessing situations as uncertain and uncontrollable, leading individuals to observe events as more dangerous.

5.7 SUMMARY

- Climatology is an atmospheric science which studies climatic change. Weather refers to the condition of atmosphere over a short period of time. On the contrary, climate refers to weather patterns of a place over a long period of time.
- The climate-stressors have long-term impact as compared to the major stressors of weather. The climate stressors can last for only a season or be an overall shift, as seen in global climate change.
- Climate change refers to relatively stable changes in the meteorological parameters like precipitation and temperature over a period of time in a given region. It is a global concern that is known to have a significant effect on both the physical and mental health and well-being of mankind.
- Research over the years have shown a strong correlation between changes in weather and climate and the way humans act and behave. Increase in temperature has often been linked to increase in rates of aggression, irritability, crime rate and suicides.
- Changes in climate and global warming may force people to migrate to new places, which can lead to acculturation stress. It can also lead to increased rates of physical illnesses and psychological distress.
- Since climate change is known to impact mental health in many ways, it is very important that we take necessary steps to reduce global warming, minimize mitigation of greenhouse gases, etc. One also needs to provide adequate treatment facilities for managing mental health problems and attempts should be made to enhance human resilience and their stress coping capacities.
- Seasonality consists of patterns that are periodic and repetitive in nature, and are generally regular and predictable over a time series. Various factors can lead to seasonality including weather, vacation, and holidays. In a time series, seasonal fluctuations can be contrasted with cyclical patterns.

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- Each season is known to have an impact on our overall mental state. Spring is known to be a time of rebirth, rejuvenation, growth, and blooming. Research has shown that people are more positive in spring as compared to the other seasons. Summer is seen as a time for adventure, sunshine, outdoor exploration, reflection, and exploration. Autumn is usually seen as a relatively stressful time, with busier schedules and colder weather. Winter is often seen as gloomy and is associated with a greater risk for various mental health concerns.
- Natural disaster is an event, which is caused by the natural forces of the Earth and brings about tremendous damage and, loss of life. Earthquakes and tsunamis, floods and volcanic eruptions, mudslides and wildfires are some examples of Natural Disaster.
- Geological disasters are caused due to changes in the earth, either above or below the surface. These can be catastrophic in nature. For instance, volcanic eruptions frequently occur due to the contact between tectonic plates.
- Hydrological disasters are triggered by the change in quality, distribution or movement of water below the surface or in the atmosphere. These changes are sudden and violent in nature. For example, a tsunami, which is caused due to earthquakes or volcanic eruptions under the seabed, involves the displacement of a large volume of water.
- Extreme weather conditions such as rain, snow or drought cause meteorological disasters. The earth's atmosphere and the weather-forming process, are affected by meteorological disaster. This disaster is destructive to the environment and can bring about mayhem.
- Technological disaster can be defined as a catastrophic event that are caused by either human error in controlling technology or a malfunction of a technology system. Structural collapses of bridges, mines and buildings, and industrial accidents, like chemical or nuclear explosions are included in technological disasters.
- Risk is said to be an activity, event or situation that has the probability of bringing about adverse outcomes which are uncertain in nature.
- Risk perception refers to an individual's specific judgment about the dangers associated with some activity, event or technology. Research has developed numerous techniques to evaluate subjective risk judgments.
- Emotions influence the way one views risk. Different emotions can have a different impact on the perception of risk. For example, fear increases and anger reduces risk perception, even though both are considered to be negative emotions. Fear is associated with assessing situations as uncertain and uncontrollable, leading individuals to observe events as more dangerous. Emotions not only affect risk perception; they also result as reactions to apparent risks.

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5.8 KEY WORDS

- **Climatology:** It is the study of climate and how it changes over time.
- **PTSD:** It stands for post-traumatic stress disorder. It is a mental health condition that is triggered after experiencing or witnessing a terrifying event.
- **Natural disaster:** It is an event, which is caused by the natural forces of the Earth and brings about tremendous damage and loss of life.
- **Technological disaster**: It can be defined as a catastrophic event that are caused by either human error in controlling technology or a malfunction of a technology system.

5.9 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What do you mean by seasonality?
2. What is a natural disaster?
3. What is the relationship between natural disasters and conflict?
4. Write a short note on environmental risk perception.

Long-Answer Questions

1. Discuss the impact of weather and climate issues on the human psyche.
2. Explain the impact of seasons on the overall mental state.
3. Analyze the impact of natural and technological disasters.

5.10 FURTHER READINGS

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UNIT 6 ENVIRONMENTAL PROBLEMS AND SOLUTIONS

Structure

6.0 INTRODUCTION

Psychology plays an important role in addressing the environmental problems and understanding the human response to those problems. Environmental psychologist not only interrogate the influence of the environment on human beings but also analyze the impact of humans on the environment. In this light, sustainability has become the need of the hour as it is important for human beings to live in harmony with the environment, without causing it damage or destruction. This unit will discuss the solution to environmental problems and also highlight the importance of sustainable design.

6.1 OBJECTIVES

After going through this unit, you will be able to:

- Understand the role of psychology in environmental sustainability
- Discuss the importance of sustainability
- Examine the solutions to environmental problems
- Explain the concept of sustainable design

6.2 PSYCHOLOGY OF ENVIRONMENTAL PROBLEMS

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Psychological research is significant in understanding and influencing human response to climate change. Humans feel that they have the power to do anything with the environment. People tend to ignore or deny problems**.** They feel helpless; so environmental messages should convey some element of hope. Climate change has been increasingly identified as one of the most significant challenges in recent times.

Psychological research examines the relationship between thinking, perceptions, feelings and behaviour. Few of the several topics addressed by psychological research and practice are: risk perceptions, behaviour change, and the built environment, barriers to action, and models of decision making, motivation for action, communication about climate change, disaster preparedness, and processes of adaptation.

The need to change its energy policy has been recognized, as a result of which the 'Energy Strategy 2050' was introduced. The success of energy system's revolution is not limited to its dependence on the development and expansion of novel infrastructures and technologies; it also depends on the fundamental changes in decision-making patterns and behaviours on the part of the consumers. The measures used earlier to encourage more sustainable energy consumption are now focused on providing information and financial incentives. For example, brochures on the subject of saving energy are provided by the Swiss Federal Office of Energy.

According to Brosch & Mertens, (2017) in recent years, investigations have focused on the effectiveness of the practice of so-called 'nudging'. These interventions in the decision-making environment, can lead to more energy-efficient decisions and behaviours without creating monetary incentives or constraining consumer choice through prohibition.

Environmental psychologists deal not only with the influences of the environment on humans but also the impact of humans on the environment. Within the perspective of psychology, the environment is regarded as both, the outer physical material and sociocultural habitat of humans. Hence, it not only includes the natural environment but the built urban environment as well.

Role of Psychology in Environmental Sustainability

Environmental scientists warn that the health of the planet is rapidly deteriorating, and the primary cause is human behaviour. Psychology attempts to understand and change the behaviours that negatively impact global ecosystems; however, environmental issues are not generally included in psychology curricula, and psychology is also not represented in environmental curricula.

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Scientists, management agencies, and a broad spectrum of leaders caution that global changes in climate such as increasing temperatures and shifting precipitation patterns, should no longer be ignored. Reducing greenhouse gas emissions; safeguarding our agricultural economy and food supply; building stronger, safer water infrastructure; and preparing for climate-related public health crises are some of the globally discussed and debated themes.

Geophysics, oceanography, and paleoclimatology (fields associated with climate change), only disclose a part of the picture. How cognitive processes and interpersonal relationships affect an individual's understanding of climate change is unknown to natural sciences.

Social identities, belief systems, and motivational biases influence perspective of the common public towards climate change more strongly than mere scientific knowledge about the topic. The psychological perspective gives an understanding of the impact of individual factors of human interactions on the understanding of climate change.

The contribution of psychology to the understanding of climate change has not been completely uncovered yet. Psychologists are encouraged to expand their engagement with important environmental issues through multiple research approaches in order to further their understanding of human behaviour, contributions to human well-being, and relevance to other disciplines and to society.

6.3 SUSTAINABILITY

Sustainability is the study of how natural systems function, remain diverse and produce everything it needs for the ecology to remain in balance. Sustainability facilitates the idea of human beings living in harmony with the natural environment without causing it damage or destruction.

Three Pillars of Sustainability

The three pillars of sustainability are as follows:

1) Economic Development

Disagreement of people on political ideology of what is and is not economically beneficial, and its impact on businesses and by extension, jobs and employability is a problem. Businesses and other organizations are required to adhere to sustainability guidelines along with their normal legislative requirements.

2) Social Development

Most important facet to this pillar is awareness of legislation protection, of people's health from pollution and other harmful activities of business and other organizations.

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3) Environmental Protection

There is a need to protect the environment, whether it is through reusing, recycling or reducing our power consumption by switching off electrical appliances rather than using them on standby, or by walking for short journeys instead of taking the bus. Prevention of pollution and limiting the carbon emission is also important. Incentives are provided for installation of renewable powers sources in homes and businesses.

What are the Primary Goals of Sustainability?

The goals of sustainability are given below:

- To reduce poverty and hunger
- To improve standards of education and healthcare, particularly water quality and better sanitation
- To attain gender equality
- To have sustainable economic growth (promoting jobs and stronger economies)
- To tackle effects of climate change, pollution and other environmental factors that can harm people's health, livelihoods and lives.
- To include health of the land, air and sea

History of Sustainability

Since the *Neolithic Agricultural Revolution* (maybe even before that), humans have been seen as consumers of resources rather than one who replenishes resources. Hunter-gatherer societies moved into an area to consume all the resources for a certain season, only to return the next year and repeat the same.

Initially, the ecological pressures forced people into making these kind of changes (growing human population being one of those pressures); as a result they had to move to a new place where the environmental conditions could better sustain them and their practices, or make further changes to their prevailing environment.

Many civilizations collapsed because of their incapability to adapt to the conditions brought in by these unsustainable practices. Though Renaissance and some enlightened philosophers expressed concern about resources and over-population, and questioned whether these practices were sustainable in the long term, the issue was only considered as a hypothetical question. Before the 20th century, we were able to understand the impact of environment change. The late 20th century marked the establishment of the science of environmental climate change. By the 1980s, we knew about the problems related to environment like-the greenhouse effect and the destruction of the ozone layer. There was mindfulness regarding the notion that some of our resources, predominantly fossil fuels, were finite and that we should make efforts to move to renewable methods of power.

The social, economic and scientific birth of the environmental movement was seen then.

6.3.1 Common Dilemma

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A common dilemma is one in which individuals in a group make decisions out of self-interest, eventually causing unintended harm to the entire group. A commons dilemma start from the perspective of the resource, and addresses environmental problems in terms of their behavioural causes.

The article 'The Tragedy of the Commons' by Garrett Hardin imagines that all houses in a neighbourhood should be entitled to a water table. Economically, the ideal strategy for every home should be to use as much water as the family desires; all of their needs will be met.

Research on Commons Dilemmas

Investigations show that people are not good at managing a resource over a long period of time. Psychologists have identified factors that motivate people to be better resource managers. These can be internal or external to a person. Evidence of internal factors display that people are conserving only if they feel the need to, or perceive pressure to conserve, or if they believe that the resource is inadequately sized, or have previously caused (rather than merely experienced) resource failure, and socially identify with the group.

For external factors, research stressed on the usefulness of leader-based systems of resource sampling, under which only one individual determines how much of the resource each person receives. Emerging evidence indicate that the leader can become entitled and start to claim a disproportionate quantity of the resource for himself or herself.

A common evolving issue focuses on the amount and specification of information withheld by a group member. In real scenarios, there exists a lack of such information regarding both, the fellow group members and the commons. The impact of this uncertainty is being investigated. A general perspective states that consumption of information increases as specificity of the commons information decreases, this being magnified if some people get to sample the commons before others.

6.3.2 Solution to Environmental Problems

Most common solutions to the environmental issue are as follows:

- Promote the use of reusable items.
- Minimize use of paper.
- Conserve water and electricity.
- Support eco-friendly practices.
- Recycle the waste to conserve natural resources.

Ten Environmental Solutions

Here are some solutions to environmental problems

UN Sustainable Development Goals

The UN Sustainable Development Goals offers the best possible framework for dealing with most pressing problems. Following are the 17 goals that almost all countries have agreed to:

- No poverty
- Zero hunger
- Good health and well-being
- Quality education
- Gender equality
- Clean water and sanitation
- Affordable and clean energy
- Decent work and economic growth
- Industry, innovation, and infrastructure
- Reduced inequality
- Sustainable cities and communities
- Responsible consumption and production
- Climate action
- Life below water
- Life on Land
- Peace, justice and strong institutions
- Partnerships and Goals

Innovation

Innovation is an important environmental solution. Round the globe, people are working on innovative technologies and solutions that would aim to revolutionize our perspective towards the notions of energy and waste. The solution to these are yet unknown. Investment in research and development is the need of the hour which is expected to be taken care of by governments and companies.

Affordable and clean energy

There are diverse forms of clean and renewable energy. Solar, wind, and hydro energy are considered renewable energy sources. Nuclear energy, a non-renewable source of energy, contributes little to climate change, and is an example of clean energy.

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Conservation of natural resources

One important environmental solution is conserving the natural resources. The strategies below help individuals and companies conserve resources:

- **Zero waste –** It is a technique used by individuals in order to reduce their impact on the environment. This can be done reducing the contribution towards landfills by reducing the use of plastic or by reusing things.
- **Circular economy –** 'A circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems,' according to the Ellen MacArthur Foundation.
- **Sustainable living –** Sustainable living is making lifestyle choices that contribute less towards environmental problems.
- Recycling
- Upcycling

Carbon Capture and Sequestration

Carbon Capture and Sequestration (CCS) removes carbon-dioxide (CO_2) from the atmosphere and stores it in the soil, trees, plants or underground. CCS is considered one way to ease climate change. Photosynthesis, the process in which trees and plants take-up atmospheric carbon dioxide and store that carbon in healthy soil is the simplest way to capture carbon. But there are more high-tech ways to sequester and capture carbon as well. One way is through geo-engineering.

Sustainable business and investing

Many industries like Patagonia, Interface, and IKEA, have established sustainability and resilience as core values of their companies. On the other hand, others have avoided sustainability by using techniques of lawyering-up, loopholes and lying about the damage their businesses create.

Improved food production

Food production and countless problems related to it are gaining a lot of attention from media. Veganism and plant based diets are considered as solutions to problems related to food, as advocated by some conservationists and journalists. Underneath is a short list of budding organic solutions to problems associated with food production and water deficiency:

- Regenerative agriculture
- Lab-grown meat
- Plant-based meat
- Vertical farms
- Precision agriculture

- Anaerobic digestion
- Water desalination

Sustainable homes

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A lot of energy is used up in our homes to run dishwashers, washing machine and dryers and HVAC systems. Also, a great portion of energy is consumed in charging our electronic gadgets and watching television. Given below are a few home related environment friendly options:

- Net Zero homes
- Home electrification
- Living Buildings
- LEED-certified buildings
- Energy star appliances

6.3.3 Sustainable Design and Designing More Habitable Environments

Sustainable design is an environment friendly approach and considers natural resources as part of the design. Sustainability focuses on reducing the consumption of non-renewable resources; it minimizes waste, and creates healthy, productive environments. Sustainable design aims to reduce the negative impact on environment. The term 'sustainable design' has been used in manifold disciplines, including product design, architecture design, interior design, and graphic design.

The Role of Design in Sustainability

Our role as designers is to solve problems and provide innovative solutions through products or services.

Principles of Sustainable Design

1. Learning from natural systems (Bio mimicry Principle)

Nature as model

- Nature runs on sunlight.
- Nature fits form to function.
- Nature recycles everything.
- Nature rewards cooperation.
- Nature banks on diversity.
- Nature relies on local expertise.
- Nature curbs excesses within.

Nature as measure

- Nature suggests relative abundances and balances.
- Nature demonstrates achievable rates.
- Nature shows limits.

2. Respect for energy & natural resources (Conservation Principle)

This Principle states that all liveliness on the terrain comes from the sun or it came from the sun at one time.

Every day the sun shines on earth producing energy sufficient enough to meet the ever growing demand for electrical energy. But solar energy is dispersed; to collect it we require some storage mechanisms. There are several examples of concentration and storage of energy which are directly provided by nature itself.

- Physical processes

- Hydrologic cycle
- Winds and currents

- Biological processes

- Solar energy captured by plant leaves (photosynthesis)
- Food web concentration (higher forms of life eating lower forms)

- Chemical processes

- food calories $\rightarrow$ ATP in our bodies

3. Respect for people (Human Vitality Principle)

In the 20th century, most of the American infrastructure and buildings are considered utilitarian most of them are not environment friendly. For example, houses, factories and office buildings with all their electro-mechanical subsystems are more or less similar to machines in which we live, produce and work.

4. Respect for place (Ecosystem Principle)

We need to adapt to the local environment; treading light on the place, more is not better. Closer fit is better.

5. Respect for future ('Seven Generations' Principle)

Nature is time-based (solar radiation, tree growth, bacterial decay) and there is no escape from time. There are multiple ripple effects. The things which we consume are no longer available for our consumption later, unless the resources which we consume are renewable and consumed at a rate below replenishment.

6. Systems thinking (Holistic Principle)

According to this Principle, the whole thing is eventually linked to everything else on earth which creates complications when we design new products and buildings.

When a certain limit is reached or when the consequences reach to being unacceptable, change is required upstream. Most often effects are traced to multiple sources, if these sources are discerned at all.

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Check Your Progress

1. What do environmental psychologists deal with?
2. What do you mean by sustainability?
3. Mention any two goals of sustainability.
4. Who wrote the article 'The Tragedy of the Commons'?
5. Mention any two solution for the environmental problems.
6. Give examples of renewable energy sources.

6.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Environmental psychologists deal not only with the influences of the environment on humans but also the impact of humans on the environment.
2. Sustainability is the study of how natural systems function, remain diverse and produce everything it needs for the ecology to remain in balance. Sustainability facilitates the idea of human beings living in harmony with the natural environment without causing it damage or destruction.
3. Two goals of sustainability are given below:
   - To reduce poverty and hunger
   - To improve standards of education and healthcare, particularly water quality and better sanitation
4. 'The Tragedy of the Commons' was written by Garrett Hardin.
5. Most common solutions to the environmental issue are as follows:
   - Promote the use of reusable items.
   - Minimize use of paper.
6. Solar, wind, and hydro energy are considered renewable energy sources.

6.5 SUMMARY

- Psychological research is significant in understanding and influencing human response to climate change. Few of the several topics addressed by psychological research and practice are: risk perceptions, behaviour change, and the built environment, barriers to action, and models of decision making, motivation for action, communication about climate change, disaster preparedness, and processes of adaptation.

- Environmental psychologists deal not only with the influences of the environment on humans but also the impacts of humans on the environment. It not only includes the natural environment but the built urban environment as well.
- Environmental scientists warn that the health of the planet is rapidly deteriorating, and the primary cause is human behaviour. Psychology attempts to understand and change the behaviours that negatively impact global ecosystems.
- Sustainability is the study of how natural systems function, remain diverse and produce everything it needs for the ecology to remain in balance. Sustainability facilitates the idea of human beings living in harmony with the natural environment without causing it damage or destruction.
- The three pillars of sustainability are economic development, social development and environmental protection.
- A common dilemma is one in which individuals in a group make decisions out of self-interest, eventually causing unintended harm to the entire group. A commons dilemma start from the perspective of the resource, and addresses environmental problems in terms of their behavioural causes.
- The UN Sustainable Development Goals offers the best possible framework for dealing with most pressing problems. In total, there are 17 goals, ranging from removal of poverty to ensuring clean water and sanitation.
- Innovation is an important environmental solution. Round the globe, people are working on innovative technologies and solutions that would aim to revolutionize our perspective towards the notions of energy and waste.
- There are diverse forms of clean and renewable energy. Solar, wind, and hydro energy are considered renewable energy sources.
- Carbon Capture and Sequestration (CCS) removes carbon-dioxide (CO_2) from the atmosphere and stores it in the soil, trees, plants or underground. CCS is considered one way to ease climate change.
- Sustainable design is an environment friendly approach and considers natural resources as part of the design. Sustainability focuses on reducing the consumption of non-renewable resources; it minimizes waste, and creates healthy, productive environments. Sustainable design aims to reduce the negative impact on environment.

6.6 KEY WORDS

- **Geophysics**: It is a subject of natural science concerned with the physical processes and physical properties of the Earth and its surrounding space environment, and the use of quantitative methods for their analysis.

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- **Oceanography**: It is the study of the physical and biological aspects of the ocean.
- **Paleoclimatology:** It is the study of previous climates that have existed during Earth's different geologic ages.
- **Sustainability**: It is the study of how natural systems function, remain diverse and produce everything it needs for the ecology to remain in balance.

6.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. How can psychological research address environmental problems?
2. What are three pillars of sustainability?
3. Write a short note on the common dilemma.
4. What are some of the strategies used by companies to conserve natural resources?
5. Write a short note on Carbon Capture and Sequestration.

Long-Answer Questions

1. Examine the role of psychology in environmental sustainability.
2. Explain the importance and need for sustainability in the present scenario.
3. Discuss in detail the UN Sustainable Development Goals.

6.8 FURTHER READINGS

Nagar, Dinesh. 2006. *Environmental Psychology.* New Delhi: Concept Publishing Company.

Cassidy, Tony. 2018. *Environmental Psychology: Behaviour and Experience In Context.* New Delhi: Taylor & Francis

Veitch, Russell and Daniel Arkkelin 1995. *Environmental Psychology: An Interdisciplinary Perspective.* New Jersey: Prentice Hall.

Gifford, Robert. 1997. *Environmental Psychology: Principles and Practice.* Boston: Allyn & Bacon.

UNIT 7 THEORETICAL ORIENTATIONS

NOTES

Structure

7.0 INTRODUCTION

Environmental psychology attempts to understand how physical environment influences human behaviour and how the attitude and behaviour impacts the environment. There are different theoretical approaches and methodological approaches that aims to enhance pro-environment behaviour. More recently, social psychological approaches have come to the fore. This unit will discuss in detail Urie Bronfenbrenner's Ecological Systems Theory and Roger Barker's concept of environmental psychology.

7.1 OBJECTIVES

After going through this unit, you will be able to:

- Understand the social psychological perspective of environmental psychology
- Discuss in detail Urie Bronfenbrenner's Ecological Systems Theory
- Explain Roger Barker's concept of environmental psychology

7.2 SOCIAL PSYCHOLOGICAL PERSPECTIVE

Environmental psychologists not only study how the physical environment affects behaviour, thinking, and well-being but also examine how behaviour, attitudes, belief systems, etc. affect the environment. They also study various social aspects of human behaviour such as violence in jails, weather and altruism, effect of environment on crime, privacy, crowding, territoriality, effect of noise, lighting,

pollution, etc. on interpersonal relationships, spatial arrangement in offices and schools and its impact on human behaviour, social aspects of managing resources, and our role in climate change.

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They try to answer some of the following key questions:

1) When trying to resolve resource dilemmas, how much importance should people give to their own self-interest vs community interest? Also which social factors play a role when individuals sit to resolve such conflicts?
2) How can one improve the physical environment? Environmental psychologists usually use two ways to deal with this, namely, social design (a process by which any building may be designed so that it is user friendly for the people for whom it has been constructed) and defensible space (a way of fighting crime through careful arrangement of physical environment such as aspects of communities, retail buildings, residences, etc.).
3) Which social factors will play a role in designing an environment that facilitate or limit human interactions?
4) How can various social dilemmas such as public goods problem, social traps, and resource dilemmas can be resolved? Public good dilemmas involve problems about whether one should contribute, time, money, effort, etc. to a project that would benefit everyone (like building a neighborhood children's park), especially when such a contribution is voluntary. Research has shown that people usually avoid contributing to public goods problems because they feel that if others contribute well, then they can also enjoy the benefits without having to contribute anything. They may also feel that if they contribute more and others don't, the project may fail and their efforts may go waste.
5) Social traps are social dilemmas that lead to short term gain. It, however, leads to long term pain or loss such as smoking, overeating, etc. It tries to find out how people try to resolve such social dilemmas. Research has shown that social traps get created because long term negative impact is usually uncertain and people also tend to discount the negative outcomes.
6) With respect to resource dilemmas, it has been found that people tend to exploit resources as much as possible when the supply of resources seems large or limitless. However, when resources are limited, people sometimes tend to act more out of self-interest keeping the community welfare aside.
7) What are various factors that seem to underline pro-environmental behaviour?

Since we know that several environment problems pose a threat to human well-being and environment sustainability and many a times human behaviour is

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related to occurrence of environmental problems, environmental psychologists also try to find ways to enhance pro-environmental behaviour among humans.

Steg and Vlek (2009) have given a four step model to promote pro-environmental behaviour change among humans. They have suggested the following four steps:

1) Choose a specific behaviour to be changed that will improve the quality of the environment.
2) Examine the primary factors underlying this behaviour.
3) Design and apply an intervention to change the behaviour in order to reduce its environmental impact.
4) Evaluate the effects of these intervention on the behaviour and on the quality of environmental and human life.

Various factors play a role when it comes to engaging in pro-environmental behavior such as awareness of the problem, human values, environmental attitudes, a sense of control, moral and social norms, degree of guilt experienced, the way attributions are made about self and others, etc. Thus, understanding the role played by various factors, we can encourage people to engage in some of the following behaviors:

a) Recycling things increasingly
b) Driving less in order to minimize pollution that results from automobile emissions
c) Encouraging people to reduce household energy usage.

7.2.1 Uri Bronfenbrenner's Ecological Systems Theory

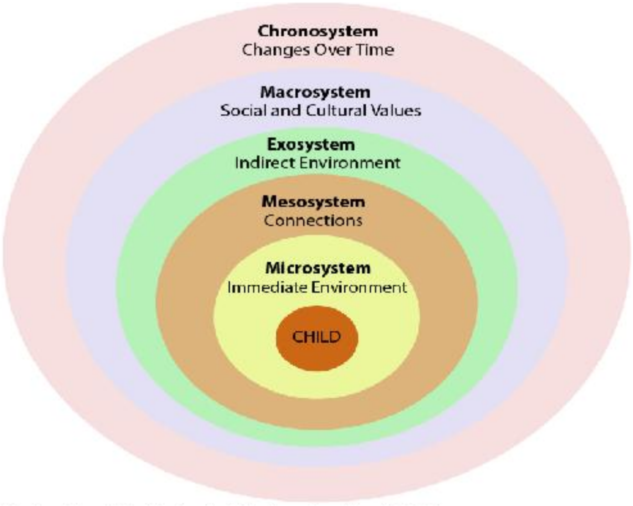


Fig. 7.1 *Bronfenbrenner's Ecological Systems Model*

According to Bronfenbrenner's ecological systems model, an individual develops as a result of exposure to various environments over time.

The largest contribution made by Bronfenbrenneron was the concept of the environment being a set of nested systems or multiple levels of influence, each inside the next making it similar to a set of Russian dolls.

Microsystem is the most proximal of these systems. It is the immediate situation where human-environment interaction occurs.

The ***Mesosystem,*** the next-level (larger) system, was defined as a system of microsystems. For example, throughout the day, a child may encounter the school bus, classroom, school lunch, recess, and home environments. All these could be considered as examples of microsystems. The **mesosystem**, for the developing individual, is the combination of exposure to all these microsystems. Then comes exosystem**,** which does not contain the developing person but impacts the child's micro and mesosystem. A child's exosystem may consist of the parent's workplace or a school district's administration. Decisions which are made within each of these microsystems have an impact on the microsystems that the child interacts with or encounters. The next level is the ***macrosystem***, which is considered as the larger sociocultural context.

According to Bronfenbrenner, cultural influences filtered down to the microsystem level which influenced day to day practices of individuals to create an environment in which individuals interact. Bronfenbrenner later added the chronosystem to this theory in order to identify the impact of various patterns of events in the environment over time. The last development of Bronfenbrenner's ecological systems theory was to the introduction of a bio ecological model that addressed the genetic influences on behaviour and development within the ecological environment.

A summary of the principles of ecological theory suggests:

a) The person-environment interaction is the major area of focus.
b) The study and intervention begins during the examination of the environmental characteristics.
c) Behavioural outcomes and proximal developmental processes are led by person–environment interaction.
d) Behaviours and proximal developmental processes occur in those environments which, when studied directly, exhibit characteristics of self-regulating behaviour settings.
e) Multiple levels of influences function in order to impact the quality of the person–environment interaction over time.

7.2.2 Roger Barker's Ecological Psychology

Roger Barker's work was focused on the study of objective features of the environment in regular lives of individuals. Although Barker was influenced by Kurt Lewin and he spent two years as a postdoctoral fellow, he shifted his path of investigation from aiming to focus on the subjective perception of the environment to conducting studies on human behaviour within their natural environments.

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The focus of Barker's ecological *psychology was* on human-environment interaction within immediate environmental understanding, which he labelled as *behaviour setting*. Barker defined the social and physical environments as Behaviour settings in which a particular behaviour takes place. For example, a basketball game at a school can act as a behaviour setting. It has a standing pattern of behaviour, and is not only limited to a characteristic of the individual involved but can function with various individuals, and has its ties to a particular time and place.

According to Barker, the strongest influence on behaviour were from places in which people live their lives, and not from their personalities or global social inputs. For example, when a young girl entered a worship service, she behaved according to the 'worship service'. If she left the worship service, and went to a basketball game, she would behave according to the 'basketball game'. After identifying behaviour setting as a unit of study, Barker shifted his area of focus from studying individual behaviour to studying the environment.

Behaviour settings were revealed to encourage physical activity. While Barker's theoretical perspective did not have a very significant impact on sport and exercise psychology, the term *behaviour setting* has been used to represent a social and physical environment for physical activity by various contemporary ecological perspectives.

Check Your Progress

1. What do environmental psychologists study?
2. What are some of the pro-environment behaviour that should be encouraged?
3. What is a microsystem?
4. What is the focus of Barker's ecological psychology?

7.3 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Environmental psychologists study how the physical environment affects behaviour, thinking, and well-being. They also analyse how behaviour, attitudes, belief systems etc. affect the environment.
2. We can encourage people to engage in some of the following behaviors:
   - Recycling things increasingly
   - Driving less in order to minimize pollution that results from automobile emissions
   - Encouraging people to reduce household energy usage.
3. A microsystem is the most proximal of these systems. It is the immediate situation where human-environment interaction occurs.

4. The focus of Barker's ecological psychology was on human-environment interaction within immediate environmental understanding, which he labelled as behaviour setting.

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7.4 SUMMARY

- Environmental psychologists not only study how the physical environment affects behaviour, thinking, and well-being but also how behaviour, attitudes, belief systems etc. affect the environment.
- Since we know that several environment problems pose a threat to human well-being and environment sustainability and many a times human behaviour is related to occurrence of environmental problems, environmental psychologists also try to find ways to enhance pro-environmental behaviour among humans.
- Various factors play a role when it comes to engaging in pro-environmental behaviour such as awareness of the problem, human values, environmental attitudes, a sense of control, moral and social norms, degree of guilt experienced, the way attributions are made about self and others, etc.
- According to Bronfenbrenner's ecological systems model, an individual develops as a result of exposure to various environments over time. The largest contribution made by Bronfenbrenneron was the concept of the environment being a set of nested systems or multiple levels of influence, each inside the next making it similar to a set of Russian dolls.
- Microsystem is the most proximal of these systems. It is the immediate situation where human-environment interaction occurs. The Mesosystem, the next-level (larger) system, was defined as a system of microsystems. Then comes exosystem**,** which does not contain the developing person but impacts the child's micro and mesosystem. The next level is the macrosystem, which is considered as the larger sociocultural context.
- According to Bronfenbrenner, cultural influences filtered down to the microsystem level which influenced day to day practices of individuals to create an environment in which individuals interact. Bronfenbrenner also added the chronosystem to this theory in order to identify the impact of various patterns of events in the environment over time.
- The last development of Bronfenbrenner's ecological systems theory was to the introduction of a bio ecological model that addressed the genetic influences on behaviour and development within the ecological environment.
- Roger Barker's work was focused on the study of objective features of the environment in regular lives of individuals. Although Barker was influenced by Kurt Lewin, he shifted his path of investigation from aiming to focus on the subjective perception of the environment to conducting studies on human behaviour within their natural environments.

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- The focus of Barker's ecological psychology was on human-environment interaction within immediate environmental understanding, which he labelled as behaviour setting. Barker defined the social and physical environments as Behaviour settings in which a particular behaviour takes place.

7.5 KEY WORDS

- **Altruism:** It is the unselfish concern for other people. It involves doing things simply out of a desire to help, not because you feel obligated to out of duty, loyalty, or religious reasons.
- **Microsystem:** The word was used by Bronfenbrenner to explain the immediate situation where human-environment interaction occurs.
- **Mesosystem:** The word was used by Bronfenbrenner to explain the system that comes after microsystem. It is a defined as a system of microsystems.

7.6 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Write a short note on the four-step model of Steg and Vlek to promote environmental behaviour.
2. What do you mean by chronosystem?
3. Briefly mention Roger Barker's concept of behaviour setting.

Long-Answer Questions

1. Discuss in detail Uri Bronfenbrenner's Ecological Systems Theory.
2. Explain Roger Barker's concept of ecological psychology.

7.7 FURTHER READINGS

Nagar, Dinesh. 2006. *Environmental Psychology.* New Delhi: Concept Publishing Company.

Cassidy, Tony. 2018. *Environmental Psychology: Behaviour and Experience In Context.* New Delhi: Taylor & Francis

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UNIT 8 SPATIO-PHYSICAL DIMENSIONS OF BEHAVIOUR

Structure

8.0 INTRODUCTION

There are several factors that determine an individual's behavioural patterns. These factors range from personal space and crowding to concerns of noise, pollution and commuting. It is important to maintain personal space, especially in work settings to ensure that boundaries are respected. In a similar vein, crowding can have a detrimental impact as it can lead to a feeling of lack of control. Noise sensitivity, air pollution and commuting are other factors which will be discussed in detail in this unit.

8.1 OBJECTIVES

After going through this unit, you will be able to:

- Understand the concept of personal space
- Discuss the meaning of crowding and territoriality
- Explain the impact of noise, pollution and commuting

8.2 PERSONAL SPACE

Personal space is defined as the physical distance between two people in a social, family, or work environment. In order to put others at comfort, it's necessary to

understand the importance of personal space. Personal space largely varies for different individuals, depending on various factors which include how well one knows the person, the relationship with that person, the level of faith one has in them, and last but not the least, one's own principles.

Determining Factors for Personal Space

The space between two individuals would probably be lesser if the two know each other. On the contrary, the space would be more the person is with a stranger. Typically, people living in crowded cities have smaller personal space preferences in comparison to those living in wide open areas.

Average comfort levels of personal space distance is mentioned below:

- Almost 0 to 20 inches for intimate couples
- About 1-1/2 feet to 3 feet for good friends and family members
- Roughly 3 feet to 10 feet for casual acquaintances and co-workers
- More than 4 feet for unfamiliar person
- More than 12 feet while speaking to a large group

General Rules of Personal Space

These rules vary according to values and setting. Here are some basic rules as guidelines:

- Never touch someone you don't know.
- Do not reach out for anyone else's children, regardless of your intentions.
- Position yourself at least 4 feet away from a person unless you know them well.
- Take a step back when someone leans away from you, you are probably hindering that person's space and making them uncomfortable.
- If you walk into an auditorium or theatre that isn't crowded, leave an extra seat between you and the next person. However, it is adequate/tolerable to sit next to someone if the room is crowded.
- On no occasion, lean over someone else's shoulder to read something unless invited.
- At no time, go through anyone else's personal belongings.
- Your dog must not be allowed to use someone else's property as washroom.
- Acknowledge personal space on the road. Don't tailgate when driving.
- Flinging your arm around or slapping on the back must be avoided unless one knows the other person well.
- Knock before entering a room.
- Avoid breaking the queue.

Personal Space at Work

To maintain professionalism, it is essential to maintain boundaries in office. Though, after working in an organisation for years and getting to know the people working there, these lines turn out to be blurred. Be conscious of other people's responses, and if they seem sore, ensure you are giving them personal space.

If you're in a professional relationship with a client or prospect, the urge to get too close must strictly be avoided. The interference with personal space may lead the client away from your service or product. You should avoid offending people when you are trying to make progress.

Work policies

- Be mindful of company policies regarding associations with co-workers.
- Don't assume your relationship with a co-worker or supervisor to be personal.
- Even when maintaining a personal relationship, hugging and other familiar actions must be avoided.
- Step into someone's workspace only if you know you are welcome. Respect boundaries when you sense the other person is busy.
- Save private chats for the lunch break or after hours.

What to Do if Someone Invades Your Personal Space?

Several actions can be taken when another person gets close to you in an uncomfortable manner. Being too direct might be hurtful for the other person and hence it is essential to identify when and how the issue should be brought up and whether it is worth bringing up.

Ways to deal with space intrusion

- Accept it.
- Lean away from the person or take a step back, hoping he or she will take the hint.
- Come right out and say you are uncomfortable being so close.
- Explain why you need more space. For example, a left-handed person who has another person too close to their left side might comment on how space is needed in order to take down the notes without the elbow being jostled.

Teach Kids How to Protect Their Personal Space

One should teach children how to protect not only their own boundaries but also respect the personal space of others in a language which children can understand. One should explain to them, how essential it is to obey the wishes of others who ask for space. Parents should also ask their children to inform them if anybody

touches them inappropriately. This can be done by showing them animations. Some parents use the analogy of a bubble, explaining how everyone has an invisible bubble around them which pops when another person gets too close.

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8.2.1 Crowding and Territoriality

Crowding is a subjective experience that makes one feel that there are too many people around them. It is not the same as population density, which is an objective measure of number of people per unit area. Crowding may not always lead to high density and vice versa. Crowding is caused by social and information overload, which may make one feel that they have no control over their surroundings. It can also create a feeling of lack of control.

Our environments and infrastructure can be built to an extent that we do not experience crowding and have a greater sense of control. For example, simply adding few entrances to a mental health centre increases client's sense of freedom. Whenever we experience crowding, we also experience stress which may generate from a greater lack of control over the physical and social environment.

Territoriality

Territoriality is a term associated with nonverbal communication that refers to how people use space to communicate ownership or occupancy of areas and possessions. We have already discussed this topic earlier on in the book.

Check Your Progress

1. What do you mean by personal space?
2. How can children be taught the importance of personal space?
3. What are the effects of crowding?

8.3 URBAN ENVIRONMENT AND STRESS

Urban life is said to be an interface of the adverse physical settings and individual characteristic, and depends on the amount of time spent in such aversive circumstances. These aversive circumstances include time spent in commuting, or in a crowd, exposure to polluted air and smoke, noise, and so on.

Urban environment pressure is the situation that signifies the level of anxiety of the urban inhabitants. A person is said to be *stressed* when these situations go beyond the level of tolerance of an individual.

8.3.1 Noise

Anderson defines noise sensitivity as a 'general measure of attitudes toward noise'. Research has shown that more than noise, noise sensitivity has detrimental effects on one's physical and mental health.

Noise and noise sensitivity have negative effects on mental health and are associated with serious health risks such as heart attacks, strokes and hypertension. Exposure to noise is also seen to reduce learning capabilities and increase anxiety in children and adolescents. Noise can be a great source of hindrance in the learning ability of a child**.** Constant background noise can also reduce the ability of children to understand words which they already know; it can impair their ability to learn new words.

Several studies have shown that noise pollution is linked to anxiety, depression, high blood pressure, heart diseases and strokes. Constant noise can make a person really anxious, and act as a trigger for panic attacks and depression.

The stress hormone called cortisol is released in greater amounts in people who experience continuous or chronic exposure. Presence of high level of this hormone in body can have a negative effect on the physical and mental health. Exposure to noise can also result in sleep disturbances which can make one vulnerable to heart problems, diabetes, obesity, etc.

Long term exposure to noise can also result in some personality changes as it can make people irritable, cranky, violent and aggressive. It can impair their ability to focus and concentrate on various cognitive tasks which may make them engage in silly mistakes or may make them forget things. This can create havoc and increase stress levels even more. In short, it can impair one's quality of life.

In addition, children and adolescents are more affected by noise in comparison to adults as their ability to cope with stress is relatively less. Also, road-traffic noise in residential areas is associated with increased number of behavioural problems in children such as emotional problems, conduct problems and increased hyperactivity. Behavioural problems in children and adolescents further lead to impairments in social skills, self-confidence, and peer relationships, thus negatively affecting their educational and occupational opportunities.

Noise sensitivity rather than noise also affects adults' mental health, as manifested in cases of depression, anxiety, insomnia, and stress.

Children and adolescents from low-income families showed a higher magnitude of association between noise sensitivity and behavioural problems than those from high-income families. Children in low-income families are more likely to experience multiple physical and psychosocial stressors which can impact mental health.

8.3.2 Pollution

Psychological and toxic effects of air pollution can lead to psychiatric symptoms, including anxiety and changes in mood, cognition, and behaviour. They can also negatively impact psychological well-being. Numerous toxic pollutants interfere with the development and functioning of the nervous system over a period of time and can also increase incidence of cancer and mortality. Air pollution is also

associated with respiratory problems like asthma, lung cancer, heart conditions, increased deaths and hospitalization.

Increased level of particulate matter (PM) in air can increase the risk of depression, anxiety disorders, bipolar disorder, and other mental health problems. They can also adversely affect cognitive development, interfere with normal cognitive performance, and possibly increase the risk of schizophrenia, dementia, and inflammation in brain and body. They also increase the risk of depression, anxiety and possibly other neuropsychiatric disorders.

The impact of air pollution—including fine particulate matter (PM)—on physical and mental health is a direct consequence of global warming and can be expected to worsen with the rise in global warming in the coming decade.

Understanding the sources of air pollution has been key to developing urban design techniques for reducing overall exposure. Sources of air pollution vary according to city and region. Some steps with respect to urban design such as pedestrianisation, sensitive zoning of industrial sites, urban vegetation, redirection of heavy traffic areas away from residences, extending or introducing low-emission zones, and facilitating public and active transport can be taken to reduce air pollution.

Active travel (including walking and cycling) can promote good mental health through integration of regular physical activity into people's daily routines, and depending on routes available, it can potentially increase exposure to natural settings. Active travel may deliver further benefits by reducing stress induced by commuting by car, and by also reducing cars on the road. This provides the opportunity to repurpose space for car parking to new public spaces that promote physical activity and positive social interaction.

One can also increase urban vegetation to minimize the impact of air pollution. Presence of urban vegetation has many benefits. Some of them are given below:

- They provide the setting for people to exercise, socialize, relax and be rejuvenated.
- They improve a sense of place attachment.
- They promote the quality and safety of neighborhoods, and facilitate social cohesion.
- It reduces stress level.

8.3.3 Commuting

Commuting as a stressor can interfere with one's family and leisure activities. It can also lead to absence from work. Commuters, in general, experience more stress in terms of their lifestyle with increased psychological and physical health problems. Cities act as a significant source of increased level of noise which further leads to increased feelings of annoyance, irritability, and insomnia. Several surveys have focused on residents' irritation with traffic noise; sometimes it can dissuade people from engaging in any kind of social activity.

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Coping with Environmental Stress

Developing coping skills can help one adapt to environmental stress. Coping is important as it can impact a person's self-confidence and stance in life. Problem-focused or emotion-focused coping can effectively reduce danger or harm. Research focuses on examining the degree to which various coping strategies have an impact on happiness and well-being.

In order to overcome stress, people implement various strategies such as social coping, environmental coping, religious coping, physical coping, and cultural coping, and so forth. There is an indication that certain coping strategies, such as spirituality, positive reappraisal, optimism, and active problem solving are associated with higher subjective well- being.

Check Your Progress

4. Which measures in urban design can potentially reduce air pollution?
5. How can one cope with environmental stress?

8.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Personal space is defined as the physical distance between two people in a social, family, or work environment.
2. One should teach children how to protect not only their own boundaries but also respect the personal space of others. This can be done by showing them animations. Some parents use the analogy of a bubble, explaining how everyone has an invisible bubble around them which pops when another person gets too close.
3. Crowding is caused by social and information overload, which may make one feel that they have no control over their surroundings. It can also create a feeling of lack of control. Whenever we experience crowding, we also experience stress which may generate from a greater lack of control over the physical and social environment.
4. Some steps with respect to urban design such as pedestrianisation, sensitive zoning of industrial sites, urban vegetation, redirection of heavy traffic areas away from residences, extending or introducing low-emission zones, and facilitating public and active transport can be taken to reduce air pollution.
5. In order to overcome stress, people implement various strategies such as social coping, environmental coping, religious coping, physical coping, and cultural coping, and so forth.

8.5 SUMMARY

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- Personal space is defined as the physical distance between two people in a social, family, or work environment. In order to put others at comfort, it's necessary to understand the importance of personal space.
- Personal space largely varies for different individuals, depending on various factors which include how well one knows the person, the relationship with that person, the level of faith one has in them, and last but not the least, one's own principles.
- To maintain professionalism, it is essential to maintain boundaries in office. If you're in a professional relationship with a client or prospect, the urge to get too close must strictly be avoided. The interference with personal space may lead the client away from your service or product.
- One should teach children how to protect not only their own boundaries but also respect the personal space of others. One should explain to them, how essential it is to obey the wishes of others who ask for space.
- Crowding is a subjective experience that makes one feel that there are too many people around them. Crowding is caused by social and information overload, which may make one feel that they have no control over their surroundings. It can also create a feeling of lack of control.
- Territoriality is a term associated with nonverbal communication that refers to how people use space to communicate ownership or occupancy of areas and possessions.
- Anderson defines noise sensitivity as a 'general measure of attitudes toward noise'. Research has shown that more than noise, noise sensitivity has detrimental effects on one's physical and mental health.
- Psychological and toxic effects of air pollution can lead to psychiatric symptoms, including anxiety and changes in mood, cognition, and behaviour. They can also negatively impact psychological well-being. Increased level of particulate matter (PM) in air can increase the risk of depression, anxiety disorders, bipolar disorder, and other mental health problems.
- Commuting as a stressor can interfere with one's family and leisure activities. It can also lead to absence from work. Commuters, in general, experience more stress in terms of their lifestyle with increased psychological and physical health problems.

8.6 KEY WORDS

- **Personal space**: It is defined as the physical distance between two people in a social, family, or work environment.

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- **Bipolar disorder:** It is a mental illness that brings severe high and low moods and changes in sleep, energy, thinking, and behaviour.
- **Dementia:** It is a collective term used to characterize symptoms like loss of memory and judgment.

8.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Why is it important to maintain personal space at work?
2. What are some of the ways one can deal with intrusion into personal space?
3. Write a short note on crowding and territoriality.
4. What are the benefits of urban vegetation with respect to air pollution?

Long-Answer Questions

1. Discuss the importance of personal space.
2. Explain the impact of noise sensitivity on physical and psychological well-being.
3. Examine the impact of air pollution.

8.8 FURTHER READINGS

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BLOCK - III
PERCEPTION AND PLANNING

UNIT 9 TOWARDS BETTER ENVIRONMENT

Structure

9.0 INTRODUCTION

The importance of environmental awareness has increased manifold considering the global challenges posed to the environment. Environmental degradation should be avoided at all costs to ensure that the basic needs of the individuals are met. The government as well as the media have taken effective measures to bring about a change in the attitude towards environment. Similarly, Non-Governmental Organizations (NGOs) have also focused their efforts towards environmental issues and responsibilities. This unit will discuss the role of mass media and NGOs in creating a sustainable environment.

9.1 OBJECTIVES

After going through this unit, you will be able to:

- Understand the role of media and government in safeguarding the environment
- Discuss the role of NGOs in creating environmental awareness

9.2 PLANNING, ROLE OF MEDIA AND OTHER PRACTITIONERS

Many nations are facing issues in safeguarding the environment. The government and various other Non-Governmental Organizations (NGOs) have taken initiatives in planting trees, cleaning the polluted lakes and educating the masses about the

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importance of a hygienic lifestyle. But people should also be aware of their responsibility towards environment as it is only with their small steps that we can gradually bring a change in protecting the environment. Media plays a major role in creating awareness among individuals of their duties towards the environment because people both in rural and urban areas are not educated enough to know about the destruction and protection of nature and the steps that can be taken to prevent environmental degradation. Food, water, clothing, and a clean and safe environment is the basic need of individuals. The government, on their part, has launched campaigns like '*Swachh Bharat Abhiyan*' that promotes sanitation. Together, media and government can bring about a massive change.

The issue of sustainable environment has gained media coverage through newspaper, radio and television programs. Our society is becoming aware of the actions that degrade the environment and in this regard they are taking steps to protect the environment.

Role of Media in Environmental Awareness

Media plays a crucial role in creating awareness among people about global climate change and the actions that can be taken to prevent the situation from getting worse. There are majorly two ways in which we consume media. They are:

a) Mass Media (radio, television, newspaper, magazines, etc.)

b) Institutional Media (school, government officers or political leaders, etc.)

Let us discuss the forms of mass media.

Mass Media

In India, for conveying a message among people, we need television and vernacular press. These are effective tools not only create awareness about the environment but also makes people question various things.

- **Print Media (Newspapers):** The print media can play an important role in environmental protection. Articles and news can have a greater impact than electronic media on creating awareness.
- **Radio:** Many people in villages have access to radio rather than television because it is cheaper, portable and handy. It covers almost the entire country. But the time spent on listening to radio is limited to half an hour – two hours a day. The broadcasts on environment is mostly at a regional level, and an increase in the broadcast has not been seen.
- **Television:** There are about 150 million homes in India which have access to television. Discovery, National Geographic and Animal Planet channel are presenting wildlife and drawing the common man's attention to the environment. But, because of commercialization, editors of these channels believe that they can't earn by showing the contents of nature.

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- **News Media (Social Media and Internet):** Youth and various government agencies or industries are actively using Facebook or Twitter for various global and local issues and to interact with people around us.

  The National Policy on Education states, 'there is a need to create consciousness of the environment science which must permeate all ages and all sections of the society beginning with the child. Environmental consciousness should inform teaching in schools and colleges and should be integrated in the entire education process'.

9.2.1 NGOs Contribution in Changing Behaviour to Save the Environment

An NGO is an organisation that is unaffiliated with government and has a non-profit base. The groups are led by citizens who aim at dedicating their resources and time to social, political and environmental issues and responsibilities. NGOs connect communities across the country and also involve various developmental activities. NGOs conduct researches which facilitate development, building institutional capacity, and facilitating independent dialogue with civil society. This will help individuals in developing a sustainable lifestyle. There is a need for a legal framework that helps NGOs to get more funds so that they can reform themselves.

Some of the international environmental organizations are Greenpeace, Worldwide Fund for Nature' (WWF), Earth First, etc. Let us discuss them in detail.

Greenpeace

Greenpeace, is an independent, international, environment-friendly organisation. It aims at promoting environmental awareness and uses a friendly confrontation with government and companies; they expose the global environmental problems and provide solutions for a healthy environment.

Worldwide Fund for Nature (WWF)—India

It is an international organisation, for wildlife conversation which focuses on protecting specific species and wildlife and is responsible for conservation of natural habitats and ecosystems in India. It saves already degraded and threatened natural bounties in our country. It became the Worldwide Fund for Nature in 1986. The WWF-India Mission has five broad program components:

a) Promotion of India's ecological security and reviving the ecological balance.

b) Conserving bio diversity of the country.

c) Using the natural resource base in a sustainable manner.

d) Minimizing pollution and wasteful consumption, promoting sustainable lifestyles.

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e) Implementing conservation programs through field programs, communication, NGOs networking and public policies.

The key environmental issues WWF-India has involved itself with, are the tiger conservation program, fresh-water and wetlands program, river dolphin conservation program, wildlife trade monitoring, managing forests, environmental law, information management and environmental education.

Check Your Progress

1. Which campaign of the Indian government promotes sanitation?
2. What are the two major ways in which we consume media?
3. Why do people in villages have access to radio rather than television?
4. Name some of the prominent international environmental organizations.
5. Mention the key environmental issues the Worldwide Fund for Nature has involved itself in.

9.3 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The Indian government has launched 'Swachh Bharat Abhiyan' to promote sanitation.
2. There are majorly two ways in which we consume media. They are:
   (i) Mass Media (radio, television, newspaper, magazines, etc.)
   (ii) Institutional Media (school, government officers or political leaders, etc.)
3. Many people in villages have access to radio rather than television because it is cheaper, portable and handy.
4. Some of the international environmental organizations are Greenpeace, Worldwide Fund for Nature' (WWF), Earth First, etc.
5. The key environmental issues WWF-India has involved itself with, are the tiger conservation program, fresh-water and wetlands program, river dolphin conservation program, wildlife trade monitoring, managing forests, environmental law, information management and environmental education.

9.4 SUMMARY

- Many nations are facing issues in safeguarding the environment. The government and various other NGOs have taken initiatives in planting trees, cleaning the polluted lakes and educating the masses about the importance of a hygienic lifestyle.

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- Media plays a major role in creating awareness among individuals of their duties towards the environment because people both in rural and urban areas are not educated enough to know about the destruction and protection of nature and the steps that can be taken to prevent environmental degradation. The government, on their part, has launched campaigns like 'Swachh Bharat Abhiyan' that promotes sanitation.
- Media plays a crucial role in creating awareness among people about global climate change and the actions that can be taken to prevent the situation from getting worse. There are majorly two ways in which we consume media. They are:
  - a) Mass Media (radio, television, newspaper, magazines, etc.)
  - b) Institutional Media (school, government officers or political leaders, etc.)
- An NGO is an organisation that is unaffiliated with government and has a non-profit base. The groups are led by citizens who aim at dedicating their resources and time to social, political and environmental issues and responsibilities. NGOs connect communities across the country and also involve various developmental activities.
- Some of the international environmental organizations are Greenpeace, Worldwide Fund for Nature' (WWF), Earth First, etc.

9.5 KEY WORDS

- **Mass Media:** It refers to a diverse array of media technologies that reach a large audience via mass communication.
- **Social Media:** It refers to a form of electronic communication that allows users to create and share content or to participate in social networking.
- **NGO:** It is an organisation that is unaffiliated with government and has a non-profit base. They dedicate their resources and time to social, political and environmental issues and responsibilities.

9.6 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the different forms of mass media?
2. Briefly mention the role of social media and Internet in increasing environmental awareness.
3. What are the broad program components of WWF-Nature?

Long-Answer Questions

1. Discuss the role of media in increasing environmental awareness.
2. Examine the contribution of NGOs in changing the mind-set regarding the environment.

9.7 FURTHER READINGS

Nagar, Dinesh. 2006. *Environmental Psychology.* New Delhi: Concept Publishing Company.

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UNIT 10 SUSTAINABILITY

NOTES

Structure

10.0 INTRODUCTION

Sustainability means meeting our own needs without compromising the ability of future generation to meet their own needs. Solar energy, biodiversity and nutrient cycling are three components of sustainability. Economic, environmental, and social (profits, planet, and people) are three pillars of sustainability. In this unit, you will learn about sustainability by understanding the concepts which hinder its effectiveness. In this unit, you will learn about environmental degradation, resource overconsumption, pollution and climate change.

10.1 OBJECTIVES

After going through this unit, you will be able to:

- Examine the types, causes and measures to prevent environmental degradation
- Describe the effects of resource overconsumption and pollution
- Discuss climate change and its relation to human health and environmental health
- Explain the reciprocal relationship between human beings and natural world

10.2 ENVIRONMENTAL DEGRADATION

Environmental degradation is defined as any change or disturbance to the environment perceived to be deleterious or undesirable. It is the deterioration of

the environment through depletion of resources such as air, water and soil; the destruction of ecosystems; habitat destruction; the extinction of wildlife; and pollution.

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Environmental degradation occurs when our natural resources are depleting, species are at the verge of extinction, and there is rapid growth of population and pollution. This can also be a situation of environment corruption. Environmental resource protection and general protection efforts are some of the ways of preventing the situation from becoming worse.

Type of Environmental degradation

Land and soil degradation, water degradation and atmospheric degradation are the three types of environmental degradation. The degradation of soil and land is because of faulty farming practice, use of fertilizers, pesticides from landfills. Water degradation is caused by illegal dumping, disposal of industrial waste into water bodies. Particle pollution and the depletion of the ozone layer are major causes of Atmospheric degradation.

Cause of Environmental degradation

The following are the major causes of environmental degradation:

- **Land Degradation**

  It is the basic form of environmental degradation. A rupture is the environmental surroundings provide a suitable environment for various weeds and allows them to grow and take control over nature and eliminate the local greenery. This results in weeds taking up all the resources and local greenery is derived from them.

- **Pollution**

  Pollution is harmful to the environment whether it is air, water, land or noise. *Air pollution* pollutes the air that we breathe, which causes respiratory issues. *Water pollution* degrades the quality of water that we use for drinking purposes. *Land pollution* degrades earth's surface as a result of human activities. When exposed to continuous large sounds like honking of vehicles on a busy road or machines producing large noise in a factory or a mill can cause irreparable damage to our ears this is known as *noise pollution.*

- **Overpopulation**

  Increase in population puts a strain on natural resources resulting in the degradation of our environment. Better and advanced medical facilities have resulted in decrease in mortality rate and an increased lifespan.

- **Landfills**

  Landfills are caused due to the large amount of waste that gets generated by households, industries, factories and hospitals. Resulting in destroying the beauty of the place.

- **Deforestation**

  The process of slashing down trees in order to clear space for construction of homes and industries is known as deforestation. Urban sprawl and overpopulation are considered as the major causes for deforestation.

- **Natural Causes**

  Avalanches, quakes, tidal waves, storms, and wildfires can totally crush flora and fauna to the point where they can no longer survive in those areas.

Effects of Environmental degradation

The following are the major effects of environmental degradation:

- **Impact of human health**

  Environmental degradation has a great impact on human health. Millions of people die because they inhale toxic air, many have respiratory diseases like pneumonia and asthma. It severely affects both their mental and physical health.

- **Loss of biodiversity**

  Deforestation, global warming, overpopulation and pollution are major causes of loss of biodiversity, that is important for maintaining the balance of the ecosystem in the form of combating pollution, restoring nutrients, protecting water sources and stabilizing climate.

- **Ozone layer depletion**

  The ozone layer protects the earth's atmosphere from harmful ultraviolet rays. The presence of chlorofluorocarbons (CFC), hydrochlorofluorocarbons (HFC) in the atmosphere, causes ozone layer to deplete.

- **Loss for the tourism industry**

  The tourism industry suffers a huge setback due to environmental degradation since loss of green cover, biodiversity, presence of landfills and increasing levels of pollution act as repellent for tourists.

Solutions to Environmental degradation

The following solutions may be adopted to combat environmental degradation:

- **Stop deforestation**

  Already there are many forests that are burned, we cannot afford to cut more trees because they are essential for producing oxygen and are home for many animals and microorganisms. Cutting trees may endanger their lives and the flora and fauna may become extinct. Prohibition of deforestation is essential for the environmental system in order to mitigate the adverse effects of environmental degradation. Tress are responsible for absorption of greenhouse gases like carbon dioxide, production of oxygen and also

provide the natural habitats to various species and hence cutting them off is not a wise option.

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- **Government regulations**

  Intervention of government is required for controlling these activities. Government needs to set a framework for controlling eco-degradation activities. They need to set high amounts of taxes for these activities that harm the environment.

- **Fines and punishment for illegal dumping**

  If there is no fine/punishment for dumping the industrial waste without treatment, they will continue to dump waste. We need to set strict policies/ penalties/fines that will be imposed without any loophole.

- **Reduce consumption levels**

  We need to put a limit to our use of the latest technology and other luxurious items. This to say that increased dependence and use of electronic devices all the time in the information age today in increasing carbon emissions a lot.

- **Reuse and reduce waste generation**

  We need to keep in mind to use our resources/our belongings judiciously. We can always recycle our old things to give them a new look and use them in a new way. In case there is no way we can use it again; we can give them for recycling.

- **Avoid plastic**

  Plastic is a huge hazard to the environment and creates many problems. Plastic does not decompose easily and emits harmful gases when burned. We need to cut down our use of plastic. We need to stop buying our household items in plastic bags. As an alternative we can use a cloth or paper bags when we go shopping.

- **Education**

  Children at school level should know about the degrading environment and consequences of various actions that lead to worsening the situation. We need to teach them about various ways we can improve our ecological footprint. This should start at school level because these children are quick learners and are eager to learn new things.

- **Convince others**

  One really needs to convince others to have an increased eco-friendly environmental attitude. We can inform them about the environment and what actually it means, and how environmental pollution/degradation can have severe impacts on our mental as well as physical health. We also need to tell about the long-lasting effects of environmental degradation, how is it

harmful for our future generation and how changing small things in our daily life can prevent these adverse effects.

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Check Your Progress

1. When does environmental degradation occur?
2. What are the major causes of atmospheric degradation?
3. What is the role of biodiversity?

10.3 RESOURCE OVERCONSUMPTION

A situation in which the use of a resource outpaces the capacity of sustenance of the ecosystem is referred to as overconsumption. Overconsumption of our natural resources reduces the effectiveness of the essential ecosystem services. Overconsumption worsens climate breakdown and natural disasters can be frequent. It also exhausts the planet's support systems (fresh water and minerals) and degrades quality of life.

According to (UNISDR 2009a) The degradation and the decline of ecosystems are invaluable services and are driving disaster risk. This can lead to change in the environmental frequency and intensity of natural hazards. For example, Deforestation can cause floods.

Overpopulation theory focuses on issues carrying capacity while not taking into consideration per capita consumption. Per capita consumption is used by developing nations in order to evaluate the consumption more than their land can support. Countries are required to restrict themselves from overuse of certain consumption,. It is often argued by Green parties and the ecology movement that consumption per person, or ecological footprint, is generally lower in poor countries than in rich nations.

Causes

There are a lot of issues that cause overconsumption, there is a huge spectrum of goods and services that we constantly consume. It ranges from food and beverage, clothing and footwear, housing, energy, technology, transportation, education, health and personal care, financial services and other utilities. Not only does their production and manufacturing requires a lot of resources and energy but their use as well as throwing away has serious consequences on the ecology. Overconsumption occurs when the consumption of resource is done not to fulfil a need but to fulfil some other social constructs. Inequitable distribution of resources, greater wealth in the form of disposable income, socially conducted standards of luxury, market driven media messages all contribute to overconsumption of resources. This is why per capita emission in developed countries are far more than in developing countries.

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Effects

Reduction in the sustainability of the earth is one of the most significant effect of overconsumption. Unsustainable consumption leads to affecting the long-term carrying capacity of the environment which is known as ecological overshoot which further leads to resource depletion, environmental degradation and reduced ecosystem health.

10.3.1 Pollution

Environmental pollution is described as the addition of contaminants in ecosystems and the surrounding atmosphere with the help of pollutants which are in the form of chemicals and energies. Climate change also results from pollution, making it a global concern due to the unfavourable consequences to both biotic and abiotic environments.

Environmental pollution is of various types

- Air pollution
- Water pollution
- Noise pollution
- Light pollution
- Thermal pollution
- Radioactive pollution
- Soil pollution
- Visual pollution
- Plastic pollution

Water Pollution and Aquatic Life

This issue holds a serious concern on global level. The availability of safe drinking water is lowering, and the levels of ground waters are depleting at an alarming rate. Added to this, industrial waste is being dumped in water bodies making it hazardous for consumption making metropolitan cities suffer from water shortage. This is also causing a massive loss in aquatic life.

Air Pollutants

Air pollution is the introduction of harmful substances including particulates and other biological substances in the air making it unfit for humans. This leads to many different kinds of ailments in humans and wild life and is also harmful for the plants.

Pollution from Noise

Noise pollution, also known as noise aggravation, can be explained as the increasing levels of noise to a point that it may hurt the action or adjustments of the nearby

living organisms. The most common sources of noise worldwide include machinery, transport, engines etc.

Acid Rain

The process of circulation of the water from earth's water bodies back in the form of droplets is known as rainfall. Water vapour rises up in the atmosphere which then condenses back to water droplets and pours down in the form of rainfall. Many times, due to pollution from fossil fuel burning, vehicular emission and emissions from manufacturing industries, sulphur dioxide and nitrogen dioxide are transported by the wind to the atmosphere where it interacts with water molecules, oxygen and other chemicals to form sulphuric and nitric acids, when these become a part of rain and fall as precipitation, this is called acid rain. As the name suggests, it is very problematic since it leads to nutrient depletion in soils as well as water bodies leading to loss of vegetation as well as aquatic life.

10.3.2 Climate Change

Climate change is described by a variation in the average weather conditions of a city or region. Variation in the temperature levels or level of precipitation in a given season is also related to climate change. Aspects of global warming and resulting shifts in weather conditions are also related to climate change.

Climate change is associated with various factors, for example, biotic procedures, variation in sunlight-based radiation received by Earth, shifting of tectonic plates, and volcanic eruptions. Recent climatic changes, referred to as global warming have been associated with distinguished human activities.

How will climate change affect us?

The destruction caused by climate change can be irreversible, which includes reduction in the amount of drinking water available, increase in flood-caused deaths, changes the ability to produce food etc. Climate change can lead to extreme changes in weather events, linking all of which to global warming might turn complicated.

Logging

Converting a forest land, woodland or stand of trees to non-timberland use by clearing the forest is known as logging. This is a special case of deforestation that incorporates converting tropical rainforests to ranches, farms or urban use.

Drought

Drought is regarded as a 'creeping phenomenon' which is considered to be a deceptive risk of nature. The effects of a drought condition vary from area to district and can be troublesome for individuals to deal with.

10.4 HUMAN HEALTH AND WELL-BEING CONNECTED WITH ENVIRONMENTAL HEALTH

NOTES

The World Health Organization (WHO) defines the environment, as 'all the physical, chemical, and biological factors external to a person, and all the related behaviours.'

Environmental health explains several human health hazards, for example, air pollution can lead to respiratory diseases like asthma, heavy metals can lead to neurotoxicity, and global climate change has the potential of spreading communicable infections. Environmental health accommodates preventing or controlling disease, injury, and disability associated with human –environment interactions.

Biosphere (the thin layer of life and life supports), contains earth's air, soil, water, and living organisms. The connection between protecting the natural environment and safeguarding human health is critical. The focus of research and legislation in recent decades has been identifying and regulating environmental toxins to reduce harmful human exposures. The effect of various environmental exposures, such as toxic chemicals, air pollution, and biological agents on the human body, is commonly perceived as the central problem in environmental health. Maintaining a healthy environment is beyond controlling these hazards.

Exposure to a healthy natural environment makes you feel better emotionally, it contributes to your physical wellbeing, reducing blood pressure, heart rate, muscle tension, and minimized production of stress hormones and even reduce mortality. Human and environment interaction affects quality of life years of healthy life lived, and health disparities.

Our physical, mental, and social well-being have a connection with our daily exposure to the natural environment. Universally people prefer interaction with natural world be it plants, animals, natural landscapes, the sea, or the wilderness. Spending time with nature suggests that we as a species may find tranquillity in natural environments and may derive health benefits from them. The evidence of human and nature contact suggests a broader paradigm of environmental health that includes health-giving environmental exposures.

Why Is Environmental Health Important?

Quality of life is directly linked with environmental health and maintaining a healthy environment and hence it is important to maintain them. About 23% of all deaths and 26% of deaths among children below the age of 5 years, globally, have their recorded cause of environmental factors which are can be prevented. They include:

- Exposure to hazardous substances in the air, water, soil, and food
- Natural and technological disasters
- Climate change

- Occupational hazards
- The built environment

Understanding Environmental Health

NOTES

Environmental Health topic has five themes which draw attention to elements of the environment and their linkages to health.

- *Outdoor Air Quality*
- *Surface and Groundwater*
- *Toxic Substances and Hazardous Wastes*
- *Homes and Communities*
- *Global Environmental Health*

Emerging Issues in Environmental Health

Environmental health is a dynamic and evolving field. While not all complex environmental issues can be predicted, some known emerging issues in the field include:

- ***Climate Change***

Climate change is projected to impact sea level, patterns of infectious disease, air quality, and the severity of natural disasters such as floods, droughts, and storms**.**

- ***Nanotechnology***

Nanotechnology's impact is significant and offers possible improvements to:

a) Disease prevention, detection, and treatment
b) Electronics
c) Clean energy
d) Manufacturing
e) Environmental risk assessment

- ***The Built Environment***

Specific characteristics of the built environment seem to have an impact on human health— while influencing behaviours, physical activity patterns, social networks, and access to resources etc.

10.4.1 Reciprocal Relationship between Human Beings and Natural World

Humans have a great pressure on the natural world. Habitats and species suffer from environmental changes caused by industry and technology. Also, they suffer from the strain caused by the world's massive human population, which has doubled in the past fifty years and is rising rapidly.

NOTES

In the ancient East, living in harmony with nature was the ethical way. When seen historically, a clear distinction between humans and environment was never seen. Humans earlier used to coexist harmoniously with other species as hunters and gathers in our nature. Even today many tribal and native communities tend to share a symbiotic relationship with nature.

Human beings and the environment share an intriguing, mutually dependent, reciprocal relationship, where the two seem to interact in multiple ways with each other. There seems to be presence of mutual obligations between place and people which is seen in everyday local practices. Thus, engaging in activities that lead to a sense of mutual caretaking is essential. Study of these reciprocal relations help us to develop better strategies that lead to environmental sustainability and community well-being.

Environmental problems are usually a result of human activities. For example, solid waste that is produced daily in our homes also creates disposal problems.

Similarly, a simple thing like an automobile that we all use account for approximately 14% of the total emitted global greenhouse gases. Also, nearly 80% of all the motorized road vehicles are used for private transportation. They also add to noise and air pollution and traffic accidents. Sometimes minimizing the use of private transport becomes difficult as use of cars is associated with psychological needs like status, power, freedom, pleasure and other desirable characteristics such as speed, comfort and convenience. Government can use hard measures to reduce use of private transport such as increased pricing, charging, taxation, establishment of traffic restricted zones etc. In addition to these, some soft measures can also be undertaken that motivate people to voluntarily switch to other modes of transport. These soft strategies work by altering people's cognitive skills, beliefs, attitudes, values or norms by starting several awareness campaigns, marketing of public transport etc.

Research has also highlighted how our natural environment is extremely essential for maintaining our physical, mental and ecological health. Living in the lapse of nature is necessary for people's physical, mental, and emotional health. This understanding has led public and policymakers to proactively conserve ecosystems, reducing the need to rescue depleted species or repair and restore their degraded habitats. One also needs to understand that for a reciprocal healing of both nature and humans, we need to look at this reciprocal relationship between humans and their environment is a sustainable and a respectful way.

To ensure human survival, we need to learn to care and conserve our wildlife, various species and their habitats while they are relatively healthy and abundant, so that they would not a need later to rescue or restore them. We need to focus on both prevention and conservation of our nature.

There are multiple ways in which we can take care of our environment such as beach or park cleaning, removing marine debris, building green corridors for wildlife movement, and maintaining and restoring natural ecosystems.

As humans we are just one of those organisms. This immediately separates us from nature, putting the human race on a pedestal as superior. We become superior because our language towards the natural world is objectifying and therefore shapes our relationship with it.

Check Your Progress

4. What are some of the acids present in acid rain?
5. Mention some irreversible destruction caused by climate change.
6. What is the contribution of exposure to a healthy natural environment on human body?
7. How do soft strategies work in case of dealing with environmental problems?

10.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Environmental degradation occurs when our natural resources are depleting, species are at the verge of extinction, and there is rapid growth of population and pollution.
2. Particle pollution and the depletion of the ozone layer are major causes of atmospheric degradation.
3. Biodiversity helps in keeping the balance of the ecosystem in the form of combating pollution, restoring nutrients, protecting water sources and stabilizing climate.
4. Sulphuric and nitric acids are some of the acids present in acid rain.
5. Some of the irreversible destruction caused by climate change include reduction in the amount of drinking water available, increase in flood-caused deaths, changes the ability to produce food etc.
6. Exposure to a healthy natural environment makes you feel better emotionally, it contributes to your physical wellbeing, reducing blood pressure, heart rate, muscle tension, and minimized production of stress hormones and even reduce mortality.
7. Soft strategies work in dealing with environmental problems by altering people's cognitive skills, beliefs, attitudes, values or norms by starting several awareness campaigns, marketing of public transport etc.

10.6 SUMMARY

NOTES

- 'Environmental Degradation is defined as any change or disturbance to the environment perceived to be deleterious or undesirable. It is the deterioration of the environment through depletion of resources such as air, water and soil; the destruction of ecosystems; habitat destruction; the extinction of wildlife; and pollution.'
- Environmental degradation occurs when our natural resources are depleting, species are at the verge of extinction, and there is rapid growth of population and pollution.
- Land and soil degradation, water degradation and atmospheric degradation are the three types of environmental degradation.
- The causes of environmental degradation include land degradation, pollution, overpopulation, landfills, deforestation, etc.
- The following are the major effects of environmental degradation: Impact on human health, Loss of biodiversity, Ozone layer depletion, and Loss for the tourism industry.
- The following solutions may be adopted to combat environmental degradation: stop deforestation, government regulations, fines and punishment for illegal dumping, reduce consumption levels, reuse and reduce waste generation, avoid plastic, promote education, and convince others.
- A situation in which the use of a resource outpaces the capacity of sustenance of the ecosystem is referred to as overconsumption. Overconsumption of our natural resources reduces the effectiveness of the essential ecosystem services. Overconsumption worsens climate breakdown and natural disasters can be frequent. It also exhausts the planet's support systems (fresh water and minerals) and degrades quality of life.
- Environmental pollution is described as the addition of contaminants in ecosystems and the surrounding atmosphere with the help of pollutants which are in the form of chemicals and energies.
- Climate change is described by a variation in the average weather conditions of a city or region. Variation in the temperature levels or level of precipitation in a given season is also related to climate change. Aspects of global warming and resulting shifts in weather conditions are also related to climate change.
- Climate change is associated with various factors, for example, biotic procedures, variation in sunlight-based radiation received by Earth, shifting of tectonic plates, and volcanic eruptions. Recent climatic changes, referred to as global warming have been associated with distinguished human activities.

NOTES

- Environmental health explains several human health hazards, for example, air pollution can lead to respiratory diseases like asthma, heavy metals can lead to neurotoxicity, and global climate change has the potential of spreading communicable infections. Environmental health accommodates preventing or controlling disease, injury, and disability associated with human – environment interactions.
- Humans have a great pressure on the natural world. Habitats and species suffer from environmental changes caused by industry and technology. Also, they suffer from the strain caused by the world's massive human population, which has doubled in the past fifty years and is rising rapidly.
- To ensure human survival, we need to learn to care and conserve our wildlife, various species and their habitats while they are relatively healthy and abundant, so that they would not a need later to rescue or restore them. We need to focus on both prevention and conservation of our nature.

10.7 KEY WORDS

- **Environmental degradation:** It is defined as any change or disturbance to the environment perceived to be deleterious or undesirable.
- **Overconsumption of natural resources:** It refers to the situation in which the use of a resource outpaces the capacity of sustenance of the ecosystem is referred to as overconsumption.
- **Environmental pollution**: It is described as the addition of contaminants in ecosystems and the surrounding atmosphere with the help of pollutants which are in the form of Chemicals and energies.
- **Climate change:** It is described by a variation in the average weather conditions of a city or region.

10.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the three types of environmental degradation?
2. List the causes of environmental degradation.
3. Write a short note on overconsumption of natural resources.
4. What are the different types of environmental pollution?
5. Briefly explain the effects of climate change.

6. What are the five themes in environmental health which draw attention to elements of the environment and their linkages to health?
7. List some of the emerging issues in environmental health.

NOTES

Long-Answer Questions

1. Describe the effects of environmental degradation.
2. Discuss the reciprocal relationship between human beings and the natural world.
3. What is resource overconsumption? Discuss its causes.

10.9 FURTHER READINGS

Nagar, Dinesh. 2006. *Environmental Psychology.* New Delhi: Concept Publishing Company.

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UNIT 11 PUBLIC REACTIONS TO POLLUTION

NOTES

Structure

11.0 INTRODUCTION

Increasing population of the world has put a lot of pressure on earth and its resources. Added to these is the fact that the traditional sources of energy and outdated technologies are creating damaging pollution levels. Public reactions to pollution is important since it not only reveals the nature of impact of pollution but also highlights the areas that can be improved upon. For understanding the public reactions to pollution three areas of study are important: environmental perception, cognition and attitude.

11.1 OBJECTIVES

After going through this unit, you will be able to:

- Describe the meaning of environmental perception, and elementary psychophysics
- Discuss the theories of environmental perception
- Explain environmental cognition
- Examine the concept of environmental attitudes and changing attitudes

11.2 ENVIRONMENTAL PERCEPTION

Environmental perception is commonly defined as, awareness of, or feelings about, the environment, and as the act of apprehending the environment by the senses.

In other words, it is a notion of perception applied to individual and community relations with the environment.

Environmental perception is a psychosocial phenomenon where environmental representation depends on cognitive and affectionate processes constructing through individual experiences. It has a complex and trans-disciplinary nature, it is multifaceted and linked to a socio-environmental perspective. Environmental perception can be seen in the following stages:

- An emotional response
- An orientated response with the construction of mental maps
- A classifying response as the individual sorts out the incoming information
- An organizing response as the individual sees causes and effects in the information

The study into environmental perception unites elements that contribute to:

- Understanding human behaviour and its interaction with environment
- Providing data for favourable man-environmental cohabitation organization.
- Planning environmental education acts

Environmental perception provides information regarding the systematic relationships among the components of our world and the means where we relate our own, the environment in which we live. The overall function is to predict the future. To create a stable environment, we refer to out past experiences, perceptions and assumptions. We cannot have a stable environment if we don't know about yesterday's environment. The expectation of a better, a stable environment is not possible without recording of past environment perception.

11.2.1 Elementary Psychophysics Perception

German scientist and philosopher Gustav Theodor Fechner established psychophysics. Psychophysics has been described as the scientific study of the relation between stimulus and sensation, as and the analysis of perceptual processes by studying the effect on a subject experience or behaviour of systematically varying the properties of a stimulus along one or more physical. Fechner, developed fundamental methods, conducted psychophysical experiments, and began investigation that still persists in experimental psychology.

11.2.2 Theories of Environmental Perception

The theories of environmental perception can be studied from two different approaches. Bottom-up theories of perception focus on how environment determines our perception, whereas, top-down theories of perception focus on how our previous experiences influence our perception of the environment and the new information we perceive. Both these theories together help us to gain a

better understanding of environmental perception. Some of the theories that have been put forward to understand environmental perception are as follows:

Gestalt psychologists are more interested in studying how humans perceive, think and make sense of their environment around them. They believe that the study of external environment has no meaning as it is the perception of the environment that we carry in our mind which influences our behaviour.

Ecological theorists believe in an inseparable connection between the person and the environment in which they exist and mutually benefit each other and share a symbiotic relationship. Roger Barker studied various ways in which the number and variety of behaviour settings remained remarkably the same even as institutions increased in size. For example, no major difference in the behaviour of students was seen whether they studies in a large or a small school.

Behavioural Constraint Theory states that when certain aspects of our environment are perceived threatening in nature, we react in ways to either escape or cope with the stressor at hand. We continue to behave in this way irrespective of the fact whether the stressor is real or perceived. We do so, as it helps us to prepare in advance for certain stressors that we may have to face in future, thus enhancing our coping capacities and survival. When we are unable to cope with a stressor, it results in learned helplessness, which may make one feel powerful and thus reduce the motivate to take some active steps to better deal with the situation at hand.

Adaptation Level Theory postulates that all human beings tend to adapt to a certain level of stimulation present in their environment, which allows human beings to function at their optimum level. It also believed that too much or too less stimulation from the environment can have an undesirable effect. For instance, an ideal teacher-student ratio is 1:25. A class that has very few children may seem dull and a class that is too crowded may add to distraction level of each child and hence both the conditions are likely to have an undesirable effect. Similarly, being with few people in life may add to our loneliness and being with many may make the place crowded and add to our irritability and anger.

Arousal Theory states that our behaviour and experiences get significantly affected and influenced by the degree, manner and the extent to which we feel physiologically aroused by various stimuli in our environment. Human beings are likely to perform the best, when they are optimally aroused. This physiological arousal can have a significant effect on our behaviours. For instance, people who tend to engage in high risk behaviours have a higher optimum level of arousal compared to others. Similarly people who tend to get satisfied easily and have a lesser need for excitement tend to have lower optimum level of arousal compared to others.

In addition, the optimum level of each individual is not a static figure as it may vary depending on the task at hand. For instance, we need high optimum level of arousal to perform a simple task but a low level of arousal to perform more complex and difficult tasks. For example, a high level of arousal in our exams,

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can add to anxiety and impair our performance, whereas a small level of arousal may not motivate us to study hard for our exams.

Environmental Stress Theory proposes that humans respond to environmental stimuli based on their cognitive and autonomic evaluation of the stressor. It is these evaluations that help us determine whether an environmental stimuli is stressful or not for us. If a stimulus is perceived as threatening in nature, it results in a stressful reaction. If we perceive a stranger standing at the corner of a street at night alone as a burglar, we are likely to react in a stressful manner by either avoiding going through that street or running back home as quickly as possible.

Environmental Load Theory states that human beings have a certain capacity to deal with a specific amount of information at a given point in time. To deal with the problem of information over load, human beings try to focus on relevant information and tend to ignore other pieces of information, as this allows them to process this information better. That is why, when we are engaged in an interesting interaction with someone, we tend to remember the conversation well, but may not remember the colour of his dress or the brand of his shoes.

Ecological biology is grounded in theories of biological and sociological interdependence between organisms and their environment. It studies how organisms interact with one another and with their physical environment at many levels such as organism, population, community, ecosystem, and biosphere level. It assumes that presence of both living and non-living factors together shape and determine the population of organisms at a place.

Organismal ecologists study morphological, physiological, or behavioral adaptations, that make it possible for an organism to live in specific habitats. They define population as a group of same species that live in the same area at the same time and they are largely interested in the study of size, density, and structure of populations and how they change over time.

Whereas, community ecologists are more interested in studying the way different populations interact with each other and its effect on the community. Ecosystem ecologists try to focus on flow of energy and recycling of nutrients among different species that live together at a place. But ecologists working at the biosphere level are more interested in the study of how different ecosystems interact with each other and affect the entire globe in ways such as bringing a change in the climate etc.

The Constructivist Approach: It was given by Neisser and Gregory. Neisser believes that perception has two parts—

- The passive aspect: called seeing that is driven by information contained in the environmental stimuli.
- The active aspect: called thinking where our mind constructs the environment in our head.

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He proposes a perceptual cycle that involves attention, motivation and perceptual processes in a dynamic process being stimulated by information received from all senses. Thus, our perception is guided by cognitive schemas that we built over a period of time and they also continue to get modified in the light of new information. Gregory also believed that thinking plays a key role in perceiving and making sense of the environment around.

Transactionalism considers human and environment as interdependent aspects of one transactional process and understanding of these interactions is very crucial. According to this approach, people choose or processor focus on only those aspects of their environment that serve some function in their life. Thus, the environment provides us information which is necessary and important in our perceptual process. Also the environment shapes our perceptual processes by determining the content of our perceptual memory in the developmental process. The person selects, interprets and gives meaning to the information received and construct a phenomic environment which is more meaningful in interpreting the behaviour than the objective environment. That is why each of us look at the environment differently.

11.2.3 Nature of Environmental Perception

Environmental perception refers to the way people perceive the environment around and how they store and evaluate information about it. This perception is likely to be subjective in nature having strong feelings and sometimes memories attached to it. Environmental perception also refers to perception of both natural and built environments, perception of other people, values, cognitions, aesthetics etc.

We respond to the environment through touch in three major ways, namely (i) Thermoreceptors (receptors that respond to heat and cold) (ii) Noceptors (help to detect changes in pressure in the environment) and (iii) Mechanoreceptors (receptors of mechanical stimuli). Mechanoreceptors enable us to detect touch, monitor the position of our muscles, bones, and joints, which is called as the sense of proprioception

Environmental perception can be seen in the following stages:

- An emotional response.
- An orientative response with the construction of mental maps.
- A classifying response as the individual sorts out the incoming information.
- An organizing response as the individual sees causes and effects in the information.

The external environment and its perception are closely related to each other and share some of the following key features:

- Environments have no fixed or given boundaries to space and time.
- Environments provide information through all the senses.
- Environments include peripheral as well as central information.

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- Environments include more information than can adequately be handled.
- Environments are defined by and experienced through action.
- Environments have symbolic meaning.
- Environmental experience always takes on the systematic quality of a coherent and predictable value.
- Environmental perception involves activity on our part, especially in terms of exploring the environment to determine what needs it meets.
- Environmental perception is likely to consider the person environment relationship from a holistic system or transactional perspective.
- Exposure to a particular environment may result in adaptation or habitation, with the weakening of a response following repeated exposure to a stimulus.

Thus, we can say that environmental perception is a result of active communication with the environment. That is why different people may perceive the same environment in quite different ways and may carry quite different perceptions of the same environment. Also, people who live in different environments tend to develop distinctive ways of recording, processing and interacting with their environment.

Environmental perception serves various functions such as

- It orients us in our surroundings.
- It provides us with information about the systematic relationships among the components of our world
- It helps us to make few predictions about the future.

11.2.4 Environmental Cognition

We also store information about our environment in term so mental maps. Mental maps are also known as cognitive maps, mind maps, cognitive models or mental models. This term was coined by Edward Tolman. They are a type of mental processing systems that enable us to acquire, code, store, recall and decode information about the relative locations, attributes of the environment. Cognitive maps also help us to construct and accumulate spatial information in terms of visual images in order to reduce cognitive load and to enhance learning and recall of information. Mental maps are presumed to be learnt in which we gradually acquire different elements of the world in terms of landmarks, routes etc. A cognitive map of an environment is basically an internalized image of that environment and it may not necessarily be correct and an accurate representation of that environment.

Cognitive maps are very personal representation of the familiar environment that we all experience. Lynch found that there are five categories in cognitive map, viz., path, edges, districts, nodes and landmarks.

(i) **Paths:** Paths are shared travelled corridors viz.. streets, river ways etc.

(ii) **Edges:** Edges are limiting or enclosing features that tend to be linear but are not functioning as paths, viz., wall, seashore etc.

(iii) **Districts:** Districts are larger spaces of cognitive maps that have some common character viz., "China town" found in many cities.

(iv) **Nodes:** Nodes are major points where behaviour is focused. It is typically associated with the intersections of major paths or places, viz., a traffic circle.

(v) **Landmarks:** Landmarks are distinctive features that people use for reference.

People are also seen to use schemas and prototypes to decode information and to recognize their environment as they guide people's behaviors in their environment and the way people react to or evaluate the environment in which they lived. People tend to arrive at their opinions about the environment based on the prototype that that environment matches with and the attitude they carry towards that prototype. These evaluations about their environment may be positive or negative in nature.

The degree to which we involve ourselves with our environment depends upon to key factors namely: complexity and mystery. Complexity increases our involvement in the environment as it has several different elements, which require attention and time to view and the individual is likely to take a greater deal of time to comprehend the same. Whereas, mystery increases our involvement as it makes us discover new information the more we try to engage with the environment. Unlike complexity, it is the mystery that increases one's preference for an environment.

Environmental cognition refers to the way people cognitively perceive the environment and the way they respond and interact with the environment. It tries to understand an individual's cognitive perceptual capacities, components of the information processing system and how they function uniquely as a whole interactive system.

Physical environment is closely related to an individual's socio-cultural environment as human beings work in different settings keeping in mind how others will react or respond to them in each of these settings. Thus our perception of environment also includes cognitive, affective, interpretive and evaluative responses. It also aims to study the environment to determine what human needs are to be met and to determine the best possible way of meeting these needs.

Exposure to a particular environment may result in adaptation or habituation. The process of adaptation and habituation refers to the process through which our response to a stimulus weakens because of repeated exposure to a stimulus. Individual differences in the ways people think about and relate to the everyday

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physical environment are assumed to be understood by environmental disposition including conservation, recreation and leisure activities, architecture and geography, science and technology, urban life and culture, aesthetic preferences, privacy and adaptation etc.

In short, we can say that perceived environment or the phenomenal environment is a major determinant of behavior with reference to any man environment system. Our perception of the environment is to a great extent based on our phenomenal self. Our phenomenal self refers to a personal construct of our self which significantly affects the way we think, feel, act and even take decisions in life. These personal constructs help to make the social world a better for our self. These personal constructs also determine which objects or events we see as more important to us and the personal meanings we give to them.

Survival of human species through adaptation with environment speaks of tremendous flexibility of the physiological and psychological system of man in accommodating environmental stress. In this way, environmental perception and cognition takes an important role in our life.

Check Your Progress

1. What are the stages in which environmental perception can be seen?
2. Who established psychophysics?
3. What does the behaviour constraint theory states?
4. Name the theory which states that human beings have a certain capacity to deal with a specific amount of information at a given point in time.
5. What are cognitive maps?

11.3 ENVIRONMENTAL ATTITUDES AND CHANGING ATTITUDES

The term attitude refers to a latent construct mentally attached to a concrete or an abstract object, which could be a place, person, object, entity or idea etc. An attitude has three components—

- **(i) Cognitive:** It refers to thoughts or evaluations we carry about the object, person, place, entity or idea.
- **(ii) Affective:** It refers to feelings or emotions that we carry towards an object, person, place, entity or idea.
- **(iii) Behavioural:** It refers to behavioural intentions and actions towards an object, person, place, entity or idea.

The term environmental attitude refers to concerns for the environment or caring about environmental issues. They are sometimes also called as pro-environmental attitudes.

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We study environmental attitudes as they determine how human beings will behave, act and respond to the environments in which they live. Some studies have shown a strong link between attitudes and pro-environmental behavior. However more than the knowledge of general attitudes, it is awareness of specific attitudes that can be more useful in predicting specific behaviors. Sometimes the measurement of environmental attitudes is subjected to social desirability bias.

To measure environmental attitudes, different scales have been developed such as Maloney-Ward Ecology Inventory, Weigel Environmental Concern Scale, New Ecological Paradigm Scale, The Motivation Towards the Environment Scale etc.

Public environmental concerns are not static in nature. They are quite variable and change with time. It is affected by several factors as follows:

- Younger people are seen to have higher level of environmental concern compared to older people.
- Women tend to show higher level of environmental concern compared to men. But, women also exhibit lower levels of pro-environmental behavior and pro-environmental knowledge compared to men.
- Low income earners display a greater environmental concern compared to high income earners.
- Wealthier countries are reported to be more concerned about the environment but individuals from less developed countries of ten display equal or greater concern.
- Environmental concern priorities may also differ between rich and poor countries. For instance, people of wealthy countries are seen to be more concerned about global environmental concerns but people in poorer countries with local environmental concerns.
- People who live in rural areas like farmers and others whose livelihood depends a great deal on the environment are seen to show more concern for environmental concerns as compared to city dwellers who live in urban areas. There are some studies that have shown mixed results too.
- With respect to religion, some studies have shown that fundamentalist Christians appear to generally have lower levels of environmental concerns compared to other groups. Religiosity is also associate with engagement in social and political issues. For instance, conservative politics also predicts lower levels of environmental concerns. On similar lines, democrats were more willing to accept that humans influence climate change more than republicans.
- Personality traits of self-efficacy, greater agreeableness, openness to experience etc., is associated with higher level of concern for the environment.

- Biospheric, altruistic and post-materialistic values and increased level of tolerance and understanding is all associated with higher levels of environmental concerns. One study found that individuals that laid lot of faith in technology or the free market had lower concern for the environmental issues.
- Engaging in nature-related outdoor activities is more closely associated with increased concern for the environment. It has also been found that cyclist show relatively more concern that off-road-vehicle-drivers. Similarly, people who engage in hunting have been found to show less pro-environmental concern compared to those who engage in activities like wild-life photography.
- Direct experience can also shape or influence our environmental attitudes. For instance, warmer local outdoor temperatures and living close to landfill area or waste disposal areas, seem to increase acceptance of global warming.
- It is believed that environmental knowledge is closely related to environmental concerns. Studies have shown that children who learn about nature informally through movies, videos, reading, talking about it etc. and teens having a knowledge of specific environmental issues were seen to display high level of concern for environmental issues. But all studies did not find the knowledge-attitude association.
- It has also been seen that people who acquire knowledge about environmental concerns by reading a newspaper report greater concern for environment than those watch TV, unless they spend more time watching science shows, news or nature documentaries.
- One study found that children who studied in private schools showed greater environmental concerns that those who studied in public schools, but sometimes the opposite was observed. Similarly, in universities students with a major in science and technology or business appeared to display less pro-environmental behaviors and attitudes than studies who studied environmental education or were engaged in ecological restoration projects.

Our environmental attitudes can also be improved by taking some of the steps mentioned below:

(i) Media: Media can have both a positive and a negative influence on our environmental attitudes. For example, media can be used to enhance knowledge and sensitivity of people towards environmental concerns. It can also teach them how to recycle things adequately. For instance, less dire messages may lead to greater understanding of public change. Similarly, empowering messages are more effective than sacrifice messages. Strong images can increase pro-environmental behaviour, but negative emotions

such as worry or fear, should be evoked only if an option for alleviating them is present.

For a media message to be effective it must meet the following 4 features:

- It should be internally consistent.
- It should tap the audience mental model
- It should keep the audience attention
- It should have an emotional component

For a message to be effective, it should take into account the following:

- The key goal of the message
- The key nature of the audience for which it is meant for
- The nature of message itself
- The communicator
- The channel of communication
- The context in which the message shall be received

(ii) Environmental Education: Formal teaching can increase environmental concerns among people. But some research has shown that teaching programs that include environmental education components are not always effective and can also have a reverse effect. Such programs have been seen to increase knowledge about environmental issues but have failed to increase concern for the environmental concerns.

But when environmental education is imparted informally through simulation, stories, activities etc., it is seen more effective in developing pro-environmental attitudes and behaviors. For an environmental education program to be effective, it must have the following key features:

- It should gear the program to the students' current level of knowledge, attitudes, and moral development.
- It should explain both sides of every issue.
- It should encourage contact with the nature.
- It should promote a sense of personal responsibility.
- It should engender feelings of control over the issue.
- It should provide potential action strategies and employ action skills.
- It should make students learn about the issue before teaching it.
- It should promote the development of social norms that favor environmental conservation and protection.
- It should enhance environmental sensitivity.
- It should involve emotional components in it.

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In addition, there are different theories that have been put forward to explain how attitudes influence our behaviors.

According to theory of planned behavior, specific behavioral intentions predict engagement in pro-environmental behaviors, which are in turn predicted by attitudes, perceived social norms, and perceived behavioral control.

According to value-belief norm model, pro-environmental values lead to pro-environmental beliefs, which further leads to pro-environmental behaviors. Presence of strong altruistic values and weak egoistic values make people to adopt pro-environmental beliefs.

Cognitive dissonance theory proposes that people are motivated to maintain attitude-behavior consistency. So, if an individual possess a pro-environmental attitude, but behaves in an inconsistent manner, he is likely to either change their attitude or behavior to attain attitude-behavior consistency. Dissonance can also work in a negative way. For instance, if one carries anti-environmental attitudes, one may refuse to behave in pro-environmental actions, to attain attitude behavior consistency.

In addition to attitudes, there are several factors that can encourage pro-environmental behaviors as follows:

- Costs and benefits inherent in engaging in a particular behavior
- Individual's morals and values
- Social norms
- Emotions
- Habits
- Contextual factors
- Seeing others behave in pro-environmental ways
- Feelings of personal responsibility or guilt
- Individual motivation
- Internationalized motivation
- Easy of enacting a behavior
- Presence of tangible rewards
- Presence of knowledge of environmental issues
- Knowledge about the action strategies that need to be taken
- Having an internal locus of control
- Presence of verbal commitment
- Tendency to feel responsibility for ones' actions

Presence of pro-environmental attitude and knowledge does not always convert into engagement in pro-environmental behaviors because of presence of the following psychological barriers:

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- Limited cognition: including problems of uncertainty about the problem, result of actions, and a lack of perceived behavioral control
- Comparisons with others: including negative social norms about action, social comparison, and perceived inequality
- Sunk Costs: including previous financial investments, conflicting goals and aspirations, and behavioral momentum
- Perceived risks: including physical, financial, social, functional, psychological and temporal risks
- Limited Behavior: Including engaging in small token behaviors, and justifying environmentally harmful behaviors by engaging in positive but simple, relatively unimportant pro-environmental behaviors.

Check Your Progress

6. Mention some of the scales developed to measure environmental attitudes.
7. What are the personality traits which are associated with higher level of concern for the environment?
8. What does the value-belief norm model say about environmental attitudes?

11.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Environmental perception can be seen in the following stages:
   - An emotional response
   - An orientated response with the construction of mental maps
   - A classifying response as the individual sorts out the incoming information
   - An organizing response as the individual sees causes and effects in the information
2. German scientist and philosopher Gustav Theodor Fechner established psychophysics.
3. Behavioural constraint theory states that when certain aspects of our environment are perceived threatening in nature, we react in ways to either escape or cope with the stressor at hand. We continue to behave in this way irrespective of the fact whether the stressor is real or perceived.

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4. It is the environmental load theory that states that human beings have a certain capacity to deal with a specific amount of information at a given point in time.
5. Cognitive maps are a type of mental processing systems that enable us to acquire, code, store, recall and decode information about the relative locations, attributes of the environment. Cognitive maps also help us to construct and accumulate spatial information in terms of visual images in order to reduce cognitive load and to enhance learning and recall of information.
6. To measure environmental attitudes, different scales have been developed such as Maloney-Ward Ecology Inventory, Weigel Environmental concern Scale, New Ecological Paradigm Scale, The Motivation Towards the Environment Scale etc.
7. Personality traits of self-efficacy, greater agreeableness, openness to experience etc., is associated with higher level of concern for the environment.
8. According to value-belief norm model, pro-environmental values lead to pro-environmental beliefs, which further leads to pro-environmental behaviors. Presence of strong altruistic values and weak egoistic values make people to adopt pro-environmental beliefs.

11.5 SUMMARY

- Environmental perception is a psychosocial phenomenon where environmental representation depends on cognitive and affectionate processes constructing through individual experiences. It has a complex and trans-disciplinary nature, it is multifaceted and linked to a socio-environmental perspective.
- Environmental perception provides information regarding the systematic relationships among the components of our world and the means where we relate our own, the environment in which we live. The overall function is to predict the future.
- German scientist and philosopher Gustav Theodor Fechner established Psychophysics. Psychophysics has been described as the scientific study of the relation between stimulus and sensation, as and the analysis of perceptual processes by studying the effect on a subject experience or behaviour of systematically varying the properties of a stimulus along one or more physical.
- The theories of environmental perception can be studied from two different approaches. Bottom-up theories of perception focus on how environment determines our perception, whereas, top-down theories of perception focus on how our previous experiences influence our perception of the environment

and the new information we perceive. Both these theories together help us to gain a better understanding of environmental perception.

- We respond to the environment through touch in three major ways, namely (i) Thermoreceptors (receptors that respond to heat and cold) (ii) Noceptors (help to detect changes in pressure in the environment) and (iii) Mechanoreceptors (receptors of mechanical stimuli).
- We also store information about our environment in term so mental maps. Mental maps are also known as cognitive maps, mind maps, cognitive models or mental models. This term was coined by Edward Tolman. They are a type of mental processing systems that enable us to acquire, code, store, recall and decode information about the relative locations, attributes of the environment.
- The degree to which we involve ourselves with our environment depends upon to key factors namely: complexity and mystery.
- Environmental cognition refers to the way people cognitively perceive the environment and the way they respond and interact with the environment. It tries to understand an individual's cognitive perceptual capacities, components of the information processing system and how they function uniquely as a whole interactive system.
- Survival of human species through adaptation with environment speaks of tremendous flexibility of the physiological and psychological system of man in accommodating environmental stress. In this way, environmental perception and cognition takes an important role in our life.
- We study environmental attitudes as they determine how human beings will behave, act and respond to the environments in which they live. Some studies have shown a strong link between attitudes and pro-environmental behaviour. However more than the knowledge of general attitudes, it is awareness of specific attitudes that can be more useful in predicting specific behaviours.
- Public environmental concerns are not static in nature. They are quite variable and change with time.
- Our environmental attitudes can also be improved by taking steps through the media and environmental education.
- In addition to attitudes, there are several factors that can encourage pro-environmental behaviors.

11.6 KEY WORDS

- **Environmental perception:** It is a psychosocial phenomenon where environmental representation depends on cognitive and affectionate processes constructing through individual experiences.

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- **Environmental cognition:** It refers to the way people cognitively perceive the environment and the way they respond and interact with the environment.
- **Environmental attitude:** It refers to concerns for the environment or caring about environmental issues.

11.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What does the study of environmental perception contribute to?
2. What is elementary psychophysics perception?
3. Mention the ways in which we respond to the environment through touch.
4. List the key features related to external environment and its perception.
5. What are the functions served by environmental perception?
6. What are the categories of cognitive maps as per Lynch?
7. Mention the three components of attitude.
8. Write a short note on the several factors that can encourage pro-environmental behaviours.
9. 'Presence of pro-environmental attitude and knowledge does not always convert into engagement in pro-environmental behaviors because of presence of the psychological barriers.' List them.

Long-Answer Questions

1. Describe the theories of environmental perception.
2. Discuss the factors which affects the public environmental concerns.
3. Explain the steps that can be taken to improve our environmental attitudes.

11.8 FURTHER READINGS

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BLOCK - IV
BEHAVIOURS AND RESEARCH METHOD

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UNIT 12 PSYCHOLOGY OF STRESS AND RESEARCHING STRESS

Structure

12.0 INTRODUCTION

Stress seems to be as old as mankind. Stress in multiple ways and manner affects each of us. It's an integral part of our life. It can be seen both as a stimulus (as a property of the event or situation we face for example, natural disaster, noise, crowding etc) and as a response (to a stimulus event known as a stressor that threatens to disrupt or disrupts one's physical and social functioning).

Stressors can be external conditions like earthquake; pollution etc., or they can be internal conditions like one's thinking patterns. Stressors are generally perceived to threaten one's well-being and demands some kind of an adaptive response. In this unit, you will learn about the psychology of stress as a concept and in the environmental context as well.

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12.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the nature of stress and people's perception of it
- Describe the models of stress
- Discuss the concept of stress in the environmental context.
- Examine the moderators of stress response and the role of stress in understanding organism-environmental relationships

12.2 STRESS

Stress is usually experienced in terms of three components, that is, emotion (such as anxiety or fear), thought (such as pessimistic self-talk) and behaviour (such as smoking). All situations, positive and negative, that require adjustment can be stressful. Thus, according to Hans Selye (1956), there are two kinds of stress: **Eustress** (refers to stress caused by positive situations such as marriage, promotion etc.) and **Distress** (refers to stress caused by negative situations such as death, divorce, loss of a job etc.). Though both eustress and distress tax an individual's coping skill and resources but distress has more potential to cause damage.

While stress is considered a major cause of various mental and physical health problems, its effects is not always undesirable. In fact, stress is a basic ingredient of life and can have several advantages as follows:

- Our biological system is equipped with some stress alarms that are essential for survival and allow one to function effectively in many situations.
- Stress seems to underlie all creative and constructive activities. A certain level of stress is necessary to perform better. Stress leads to an increase in epinephrine and nor-epinephrine levels which tend to correlate positively with performance on a variety of tasks. Stress quite often increases our efficiency and makes us search for new coping resources.
- It improves our adaptive system and thereby makes us better equipped to deal with such situations in future. It is seen that individuals who have not experienced any stress in their lives have a poor adaptive mechanism and may succumb to even mild forms of stress. On the other hand, there are people who thrive on stress and show greater efficiency in handling crisis. In essence, intermittent stress (i.e., occasional exposure but with recovery periods) leads to enhanced stress tolerance.

It is natural and healthy to maintain optimal levels of stress and success achievement, higher productivity and effectiveness all call for stress. Hence, it is advisable that each individual finds out his or her optimal level of stress as too little stress results in a boring and apathetic existence whereas too much of stress leads to undue wear and tear, making us more vulnerable to illness.

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12.2.1 Nature of Stress

Stress is considered to be subjective in nature as what may be stressful for one may not be for the other. The severity of stress is assessed by the degree to which it disrupts functioning. Various factors that predispose a person to stress have been categorized below based on the nature of stressor, person's perception and tolerance of stress and external resources and available social support.

The impacts of a stressor depends on many factors such as:

- **Its importance to the person:** Stressors that involve important aspects of a person's life such as the death of a loved one, a divorce, a job, or a serious illness——tend to be highly stressful for most people.
- **Duration of the stress:** The longer a stressor operates, the more severe its effects. For example, chronic stressors like living with a frustrating job or an unhappy marriage is likely to have more adverse effect than an acute stressor like having a fight with a friend.
- **Cumulative effect of stressors:** The more the number of stressors one faces in succession the more the stress as, these stressors tend to have a cumulative effect.
- **Number of stressors:** The more the number of stressors one experiences at the same time the more the stress. For example, if a man has a heart attack, loses his job, and receives news that his son has died in a road accident—all at the same time—the resulting stress will be more severe than if these events occurred separately.
- **The nature of the circumstances:** In difficult situations, especially those involving conflicts, the severity of stress usually increases as the need to deal with the demand approaches. For example, the anxiety of performing in an exam is likely to be higher in the hour just prior to the exam.
- **Degree of involvement:** The more closely an individual is involved in a traumatic situation, the more is the stress experienced by him or her.
- **Controllability:** The more control an individual thinks he or she can exert over the stressor, the less is the stress experienced by him or her. That is why uncontrollable events like death of a closed one are likely to be more stressful.
- **Predictability:** Being able to predict the occurrence of a stressful event, even if the individual cannot control it, usually reduces the severity of the stress a sit allows an individual to initiate some sort of preparatory process that acts to lessen the effects of a stressor. Also, with a predictable stressor, there is a safe period in which the individual can relax to some extent.

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- **Challenging limits:** Situations despite being controllable and predictable can be experienced as stressful if they push one's limits and capabilities and challenge an individual's view of himself or herself. Similarly, any change in life that requires numerous readjustments can be perceived as stressful.
- **Personality characteristics:** Research done by Friedman and Rosenman in 1974 , found that men with personality characteristics of intense drive, aggressiveness, ambition, competitiveness and the pressure for getting things done were two to three times more likely to have heart attack in middle age than men who were equally competent but more easygoing. People low on self esteem may find moderate criticism of their work highly threatening, while people with high self-esteem might find the same criticism helpful in improving their skills.

12.2.2 A Person's Perception and Tolerance of Stress

One person's stressor is another person's piece of cake. This difference in reaction to the same stressor by different people can be due to both a person's perception of threat and his or her stress tolerance.

- **Perception of threat:** If a situation is perceived as threatening and more likely to occur, whether or not the threat is real, it is likely to evoke significant stress. Also an individual who feels overwhelmed or feels that he or she will not be able to deal with the threat is more likely to experience negative consequences from the situation than a person who believes that he or she will be able to manage it. Understanding the nature of a stressful event, preparing for it, and knowing how long it will last can lessen the severity of the stress.
- **Stress tolerance:** The term stress tolerance refers to a person's ability to withstand stress without becoming seriously impaired. Not only individuals differ in their biological and psychological vulnerability to stress, but they also differ in their vulnerability to different stressors. Early traumatic experiences, lack of self-confidence and self-esteem, insecurity can leave a person especially vulnerable to certain stressors.
- **Optimism-pessimism:** Simply put optimists are people who see the glass as the half full and pessimist are those who see it as half empty. Research has shown that optimists (i.e., people who have general expectancies for good outcomes) are likely to be more stress resistant than pessimists (i.e., people who have general expectation for poor outcomes). One reason behind this could be the difference in the stress coping strategies adopted by them.
- **Hardiness:** According to Kobasa (1979), hardy people (i.e., relatively stress-resistant) seem to differ from other with respect to their high level of commitment; tendency to see change as challenge (i.e., an opportunity for

growth and development) and a stronger sense of control over events and outcomes in their life. Research findings indicate that persons high in hardiness tend to report better health than those low in hardness, even when they encounter major stressful life changes.

- **External resources and social support:** Presence of positive social and family relationships has been seen to reduce the negative effects of stress on a person and lack of social support has been seen to increase the potency of a stressor and to reduce one's capacity to cope with it. Also, presence of a chronic or life-threatening illness or a psychiatric disability in an individual is likely to increase the level of tension for all family members. Certain cultural rituals are also seen to aid an individual's coping with certain type of stressor. For instance, rituals enhancing one's faith in God, confessions and atonement can greatly help people to deal with stress related to feelings of guilt and sin.

In sum, the degree of stress experienced by a person depends on the complex interaction between the nature of a stressor and a person's resources of dealing with it.

Check Your Progress

1. What are the components in terms of which stress is usually experienced?
2. How is the severity of stress assessed?

12.3 MODELS OF STRESS

In this section, you will learn about the different models of stress.

Selye's Theory of Stress

Hans Selye in 1936 was the first one to introduce the concept of stress and to systematically investigate the effect of continued severe stress on the body. His theory of stress is based on the following assumptions:

- He believed that the nature of the stressor has no effect on the physiological response to stress.
- There is a universal pattern of defense reactions that aim to protect the person or an animal or any species, which experiences stress, and helps to maintain them their equilibrium.
- With continued or repeated exposure to the stressor, the defense reactions always move in succession through the three stages of alarm, resistance and exhaustion. These three stages together represent his concept of General Adaptation Syndrome (GAS).
- If severe and prolonged, these defense responses result in disease states which in extreme cases can even lead to death.

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He used the term General Adaptation Syndrome (GAS) to explain the concept of stress. He called it **general** because it is produced only by agents which have a general effect upon large part of the body. He called it **adaptive** because it prepares an individual to acquire and maintain strategies that can help in coping with it. He called it a **syndrome** because stress is characterized by the presence of a set of symptoms occurring together. Selye's theory of stress states that different kinds of stressors can trigger the same reaction or general bodily response. Usually, organisms have a need to maintain their equilibrium and balance (Homeostatis). A stress tends to disrupt this equilibrium and thereby calls for body to adapt and take actions to restore the equilibrium.

Thus, when faced with stress the individual's resources for coping with a stressor are altered and mobilized and his body prepares for immediate physical action by activating its sympathetic nervous system and by releasing stress hormones in greater amounts. In order to prepare to face the threat, an increase in the body's adrenal activity, cardiovascular and respiratory functions; enlargement of lymphatic system and a greater release of epinephrine is seen. In this stage known as the **Alarm Stage,** the individual is likely to experience, emotional arousal, increased tension, heightened sensitivity and susceptibility to stressors and illness, greater alertness (vigilance) and determined efforts at self-control. In addition, the individual makes use of task oriented or defense oriented or a combination of the coping measures in order to meet the emergency. During this stage, the individual may experience continuous anxiety and tension, gastro – intestinal upset or other bodily disease, and lowered efficiency, suggesting that the resources available to deal effectively with the stress are inadequate.

At this point, the individual enters the second **stage of resistance,** which is marked by the individual's efforts to endure and resist further debilitating effects of the stressor by maintaining a moderate level of physiological arousal thereby decreasing its response to other stimuli. At this stage, the individual actively makes use of task oriented coping mechanisms and ego-defense mechanisms. Here, indications of strain may exist in the form of psycho-physiological symptoms and mild reality distortion. A shrinkage in the adrenal cortex; return of lymph nodes back to its normal size; sustaining of hormone levels; high physiological arousal; and heightened sensitivity to stress may also be seen. This intermediate stage of restoration is able to successfully restores the body's balance only when the stressor is short-lined or acute.

However, if the stressor continues or there is an addition of more stressors, the body may enter the **stage of exhaustion,** where it may exhaust all his resources and is no longer in a position to resist the stressor. At this point, the individual tends to become rigid and to inappropriately hold on to previously developed defenses instead of devising more adaptive coping strategies. This can eventually lead to the onset of physical symptoms and in many cases, a major illness may occur. As the stage continues the body experiences more disintegration and is not able to maintain homeostasis. An enlargement or dysfunction of lymphatic

structures; increase in hormone levels; depletion of adaptive hormones and affective experiences like depression may occur. This stage may further be characterized by psychological disorganization and a break with reality, involving delusions and hallucination and may eventually lead to a stage of complete psychological disintegration, perhaps involving continuous uncontrolled violence, apathy, stupor and eventually death.

Although Selye's model has been beautifully able to describe the effects of continued or chronic stress on our body, but **his model has been criticized** on various grounds.

- For instance, Pestonjee (1987) stated that Selye's theory is based largely on the research conducted on other animals, which are more likely to face physical or environmental stressors whereas human beings are less often confronted by such stressors. Hence the generalization of his theory to human beings should be done with caution.
- Selye's model states that all stressors irrespective of their nature result in a non- specific physiological response. But it has been noted by researchers that there are certain stress evoking stimuli, for example, exercise, fasting and heat,(Mason 1971) which do not produce such a non-specific physiological response and hence the GAS does not hold true.
- Human beings are likely to face more intra-psychic or social (interpersonal / interactional) stressor, which have not been given their due place in this model.
- The reactions of infra-human subjects are more directed and perceptible in nature and thus can be easily measurable. However, human being's responses are always mediated through several layers of cultural and social factors.
- There is also some evidence that when faced with stressors all the symptoms of the syndrome may not appear together as stated in the model.
- Further, research suggests that different kind of stressors can evoke different physiological responses. For instance, situations producing anxiety are associated with adrenaline release while situations which produce aggression are associated with nor-adrenaline release.

Lazarus Model of Stress

The Lazarus model proposes that cognitive mechanisms are strong, and the demands of the situation can be easily met, then the individual doesn't experience stress. Stress is, however, experienced when the cognitive mechanisms are weak, or the stressor exceeds ones coping mechanisms. Lazarus believed that the experience of stress depends upon both the stressor and the cognitive appraisal of the stressor.

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In response to a stressor, the transactions between the individual and his environment are driven largely by cognitive appraisals that take place at three levels as follows:

- **Primary appraisal:** It determines whether an event is irrelevant, benign, positive or threatening in nature.
- **Secondary appraisal:** It determines whether he has enough resources or coping (cognitive or behavioural) abilities to deal effectively with the threatening event. If the individual has enough resources to deal with the event effectively then he or she doesn't experience any stress. However, when the individual does not have enough resources, then he experiences stress.
- **Tertiary appraisal:** It involves constant evaluation of the potential stressful event in the light of new available information. It is an ongoing process.

It is also quite possible that an event that was earlier seen as non-threatening or irrelevant may suddenly become threatening with change in the individual's perception of events which may make the individual realize that his coping resources are not adequate. Thus, the same non-stressful irrelevant event may be perceived by the individual as stressful.

The individuals largely engage in different kinds of cognitive appraisal, namely challenge, harm-loss and threat. When an individual engages in the **cognitive appraisal of challenge**, then he is likely to perceive a new change as an opportunity for growth and development. For example, such an individual may see loss of a job as an opportunity for a better job or a new career option. Individuals that engage in the **cognitive appraisal of harm and loss**, tend to assess the damage, loss or harm caused by the events, disease or illness. For instance, they are likely to see loss of job as an economic loss leading low self-esteem. However, the individuals that engage in the **cognitive appraisal of threat** believe that the situation or event may cause loss or harm in future. For instance, they are likely to see rash car driving as a potential for causing an accident or serious injury or death in future.

In a study conducted by Lazarus et al on students who were showed a film on an accident that took place in a shop, showed that stress is not the property of the event alone, but it also depends on one's appraisal of the event. In this study, the students were divided into three groups and were then shown a movie on an accident that took place in a shop. After the film was showed, the groups were given different information about the accident. Group I was told that no harm or injury followed the accident. Group II was told that the accident was actually designed to improve the worker's safety. However, the Group III was not given any explanation. The stress was found to be low in both Group I and Group II as the explanations given to them enabled them to make less threatening appraisals

of the event. But the stress was seen to be high in Group III as no explanation was given to them which could have altered their appraisal of the event.

The above stated Lazarus model has **three important implications**. It implies that an event is not inherently stressful. It may be appraised by someone as threatening whereas others may see it non-threatening based on their cognitive appraisal of the event. Secondly, the cognitive appraisals are extremely susceptible to change in mood, health and motivation. Hence, under different conditions different appraisal may be made. Thirdly, the body's stress response is nearly the same, whether the event is really experienced or imagined. Thus, imagined or a recalled appraisal of a situation can also evoke a stress response.

Diathesis Stress Model

The diathesis stress model proposes that an individual's susceptibility to illness and stress depends upon interaction between the biological factors (predisposition) and the environmental factors (precipitating factors). An individual's predisposition to illness and stress depends on his or her biological vulnerability to illness, the genetic make-up and his personality and behavioural characteristics. When an individual who has a higher predisposition to illness and stress when encounters external stressors such as loss of job, death of a spouse, divorce etc, then they are more likely to manifest the illness or disease. Individuals having high vulnerability are also seen to over-react to minor stress.

Check Your Progress

3. What happens at the stage of resistance in the General Adaptation Syndrome?
4. What does the diathesis stress model proposes?

12.4 COPING WITH STRESS

Generally speaking, increased levels of stress threaten a person's well-being and automatically results in the individual taking some actions to do away with stress and its harmful effects. What action an individual takes often depends on a complex interplay between internal factors like a person's frame of references, motives, competencies, or stress tolerance and external factors like one's social demands and expectations.

Ironically, some people are seen to create stress for themselves by engaging in maladaptive behaviours and cognitions rather than coping with it. Some individuals get caught in the vicious cycle of generating life events that in turn produce adjustment problems.

Individual's tend to cope with stress at three levels——at the biological or the physiological level (through the use of immunological defenses and damage-

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repair mechanisms), the psychological or the interpersonal level (through the use of learned coping patterns, self-defenses, and support from family and friends) and at the socio-cultural level (though group resources, such as labour unions, religious organizations, and law-enforcement agencies). The failure of coping efforts any of these levels may seriously increase a person's vulnerability on other levels and also to other stressors.

In order to effectively cope with stress, individuals are seen to engage in various coping strategies. Coping strategies refer to various cognitive, behavioral and emotional ways people engage in to manage stress. They are dynamic processes which neither eliminate a stressor nor prevent its re-occurrence but increase one's tolerance of the situations. All the coping strategies an individual engages in are not equally effective.

Lazarus has given two kinds of coping strategies—— emotion coping strategies and problem focused coping strategies.

- **Emotion focused coping:** It involves the use of cognitive and behaviour strategies to manage one's emotional reaction to stress. Cognitive strategies include changing one's appraisal of stressor and denying unpleasant information, whereas, behavioural strategies include taking social support and alcohol or psychoactive drug. Emotion focused coping primarily aims at distracting attention from unpleasant situations, stress evoking events and problems. An individual tends to make use of them when nothing significantly can be done to alter the stressor or stress evoking situation and events and when he or she lacks the skills or resource to meet demands posed by the stressors. Three types of emotion focused coping strategies that are frequently used are:
  - **(i) Escape avoidance:** In it, the individual physically/psychologically separates himself or herself from the stressors. For instance, to avoid the far of failing one may either not give the exam or may engage in excessive sleeping.
  - **(ii) Distancing**: It refers to psychological detachment of oneself from the stressor. For instance, over-weight people may stop thinking about their weight.
  - **(iii) Position reappraisal**: It refers to reinterpreting the situation to turn the negative aspects of the situation or the stressor into its positive aspects. For example, one may look at the loss of job as an opportunity to get something better.
- **Problem focused coping**: It involves directly dealing with the stressful situation by either reducing its demands, or by increasing one's capacity to deal with it. Three types of problem focused coping strategies that are frequently used are:

(i) Proactive coping (preventive coping): It refers to anticipate potential stressors and act in advance to either prevent their occurrence or to reduce its impact. To achieve this goal, it may make use of several mechanism like, improving problem solving skills, developed stronger social support network etc. For example, the fear of failing can be prevented by studying in advance for one's exams. This coping strategy often requires long term effects and may bring about a change in one's attitudes, cognitive styles and behaviours.

(ii) Combating coping: It refers to escape from stressors that cannot be avoided. It involves the active use of relaxation techniques, meditation and eating nutritious diet.

Research has shown that women in general and individuals from a low socio-economic status are more likely to use emotion focused strategies than men in general and people from a high socioeconomic status, who are seen to make use of more problem focused strategies. One reason behind this could that women are seen to react emotionally more to stress than men and past experiences may create feelings of helplessness and hopelessness in individuals from a low socio-economic status. In fact, in dealing with various stressors, both the above-mentioned coping strategies are often used together.

In addition to the various coping strategies, certain factors that can affect one's ability to cope with stress are as follows:

- **Hardiness**: It is seen to be associated with better coping. It is seen that individuals high on hardiness are more likely to make use of problem focuses coping strategies.
- **Resilience:** Some individuals are seen to be more resilient than others. For instance, it is seen that some children have the ability to develop into competent well-adjusted people despite being raised in extremely disadvantaged environment. Resilience may be a result of child's personality traits and the available social support. Resilient children tend to have well developed social, academic and creative skill; an easy temperament; high self-esteem, high self-description; better personal control; healthy social relationship with others; and at least one consistently supportive person in their life.
- **Explanatory style**: It can be of two types namely, positive explanatory style and a negative explanatory style. Individuals who adopt a positive explanatory style tend to attribute outcomes always to a positive event such as one's personality, hard work etc. whereas, individuals who adopt a negative explanatory style tend to attribute outcomes always to a negative event. These individuals tend to feel that they are always surrounded by failures. Pessimists have a negative explanatory style and are vulnerable to experience negative emotions like depression, anger,

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anxiety and hostility. They are also likely to have suppressed immune systems. However, in contrast to them optimists have a positive explanatory style and are more likely to experience positive emotions and are likely to increase one's social, physical and cognitive resources. They are also likely to have healthy attitudes and healthy habits. The functioning of their immune system is also seen to be better.

- **Self-regulation:** It refers to the ability to modulate their thoughts, behaviours, emotions in any and every situation. However, too much of self-control is not healthy as it leads to suppression of anger and may make an individual vulnerable to develop ulcers later in life.
- **Repression:** It is a defense mechanism adopted by some individuals who tend to repress or block the awareness of negative stress evoking events out of consciousness. It is unhealthy and may result in pathology.
- **Learned helplessness** It is a phenomenon, in which after experiencing a series of negative uncontrolled events, the individual comes to an understanding that he is helpless in the face of adverse circumstances and hence does not make effort to overcome his difficulties.
- **Social support**: The presence of adequate social support is likely to reduce stress. There are two hypotheses, namely buffering hypothesis and the direct effect hypothesis, which have been proposed to explain how social support reduces the negative effects of stress. According to the **buffering hypotheses** social support reduces stress by providing resources on the spot to cope with the stress effectively. People with good social support tend to ruminate less and this further minimizes the negative impact of the stressor on the individual. According to the **direct effect hypotheses** social support enhances the physical response to challenging situations. For example, pressure of others may reduce Sympathetic Nervous System arousal and may decrease the release of CRH.

  Individuals with better social skills tend to create stronger social network and are likely to receive more social support.

Check Your Progress

5. What are the levels at which individuals tend to cope with stress?
6. What is learned helplessness?

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12.5 ENVIRONMENTAL CONTEXT, MODERATORS OF STRESS RESPONSE AND THE ROLE OF STRESS IN UNDERSTANDING ORGANIZM-ENVIRONMENTAL RELATIONSHIPS

Environmental stressors refer to the stressors or factors which have a negative effect on the productivity of the ecosystem, its development as well as reproductive success. Such environmental stresses can be of natural origin or human induced. The environmental stressors can also be positive or negative in nature. Environmental stressors can be in the form of temperature related changes, climate change, chemical changes in the elements of the environment, competition, predation or parasitism between species. Therefore, examples of environmental stressors include a range of different things like wildfire, chemical pollution, thermal pollution, natural disasters like volcanic eruptions or tornados and hurricanes as well radiation spikes.

Let us understand the way in which environment stressors work with examples of stressors like noise, crowding and natural disaster. **Noise** tends to impair one's ability to attend to cognitive tasks and effects one's short-term memory. In a study conducted by Even et.al, in 1995, it was seen that children who lived near airport had increased blood pressure, increased cortisol levels and increased stress hormones. **Crowding** is seen as a psychological state which refers to an individual's subjective sense of space he or she needs to work and live comfortably. Crowding has also been found to correlate positively with aggression, crime rate and withdrawal from interpersonal relationships. Freedman's work (1975) on the effect of crowding on inmate prisoner showed that crowding is associated with increase in death rate, increase in blood pressure, and increase in level of stress hormones. **Natural disasters** result in loss of property, money and life; broken relationships and the need to re-begin life from a scratch in its victims. Survivors of natural disasters sometimes suffer from Post Traumatic Stress Disorder (PTSD).

The reaction or responses due to environment stress on a species level can be:

- Mortality of certain species
- The begin of a recovery or regeneration process
- Acute toxicity
- Decreased Productivity
- Evolutionary changes
- Changes in the species that dominate

Environmental stressors induce a change in the organism in terms of their fitness to work. These stressors illicit a response from humans, who need to adapt or work around these external factors to function properly. The organisms also undergo genetic changes due to the environmental stressors and these may bring

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out subtle as well as bigger changes in the future generations. It changes the relationship of the human with the environment and this is why their study is important. The role of environmental stressors, therefore, become important not only from the point of view of understanding the causation but also in trying to mitigate the impact of environmental stressors.

There are various other sources of stress related to work that can be categorized into the following headings:

Daily life hassles: It include things like forgetting things, getting stuck in traffic jam, falling ill quite often etc., which also carry a potential to evoke significant stress in an individual. In contrast to these hassles are daily life events like receiving a compliment, listening to one's favorite song, meeting friends etc., that can uplift one's mood and help in reducing stress. To measure an individual's experience of daily life hassles and daily uplifts, Lazarus has devised the Hassles and Uplift Scale. Research has suggested that daily life hassles are a better indicator of one's illness. Also, they tend to interact with the chronic background stressors like living in a crowded place.

Occupational stress: Today it is one of major cause of stress related illnesses. However, it can be managed effectively by redesigning one's job and taking appropriate intervention measures. The occupational stress can result from various sources as mentioned below:

- **Work overload**: It refers to working too hard, too long, on a number of tasks. In fact, in Japan a tern called as *Karoshi* has been coined to indicate death resulting from work overload. Workload is often determined by the quality of work and individual is supposed to undertake. For instance, it is seen that if the work is felt meaningful by people then they are likely to experience less stress. Also, when workload involves responsibility to people, then the degree of stress is higher than in conditions where workload involves responsibility for products. For example, the job of an Air Traffic Police is regarded as being quite stressful.
- **Globalizing, Down-sizing and Technology advancement:** The changing times and work scenarios have led to globalization, down-sizing and significant advancement in technology and its use in one's work places. **Globalization** is associated with culture shock which in turn calls for heavy adaptation demands. **Down-sizing** may lead to loss of job, inability to find another suitable job and to the fear of losing one's job which is quite stressful in its nature and can make the individual feel depressed and suicidal. It may also lead to significant long-term adjustment difficulties, poor self-concept, feelings of worthlessness and helplessness and hopelessness. **Advancements in technology** at one hand has made work faster and efficient but on the other hand too much computerization has made the job monotonous and boring in nature, thus reducing its meaningfulness and causing stress. It has also forced individuals to adapt and continuously upgrade themselves with the new demands of technology.

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The Role of Stress in Understanding Relationships

Let us understand the role of stress in understanding relationships.

- **Role related stress**: The term 'role' refers to expectations associated with one's position, rank or status. The more the number of roles an individual is required to perform (**role space**); the lesser the clarity about the expectations and demands associated with job (**role ambiguity**); the more an individual is required to sacrifice his own interests in order to meet expectations of others (**role bondness**); the more the stagnation and the lesser the opportunity for growth (**glass ceiling effect**); the more inadequate the resources available, the more inadequate an individual felt to perform the job (**role inadequacy**); the more the conflicting expectations and demands associated with the job (**role conflict**); the more the expectations demanded out of a role (**role overload**); and the more an individual has demanding roles to fulfill both at the workplace and at home; the more the individual is likely to feel stress. It is usually seen that women who are required to manage both their family and work pressures are likely to experience more stress than men who have to manage their work pressures only. Often work at job requires an individual to work in a team. The lack of cohesiveness and social support in one's team is likely to further increase the stress level.
- **Burnout:** It refers to a state of complete physical and psychological exhaustion which is job-related. Burnout is characterized by presence of feelings of being emotionally drained, loss of energy and fatigue (**emotional exhaustion**); loss of idealism in work and presence of negative attitude towards job and other people at the work place (**Depersonalization**) and loss of sense of work-related competence and achievement (**reduced personal accomplishment**).
- **Lack of control over work:** Dull, repetitive and job requiring less personal control are likely to be more stressful.
- **Shift work:** Jobs that require an individual to make day and night shifts are likely to be more stressful as the shifts tend to disrupt one's biological rhythm. Also, these individuals tend to frequently report complaints of headache, loss of appetite, sleep disturbance, gastro-intestinal problems and other health complaints.
- **Gender harassment:** Harassment of women at work in the form of verbal and physical abuse, eve-teasing and criticisms or nasty comments based on one's gender are likely to add to job related stress as such behaviors may lead to the development of low self-esteem, insecurity, anxiety and threat of being unsafe.
- **Personal relationships**: Presence of stable, healthy, meaningful relationships is regarded as a major stress buster. But at the same time, interpersonal conflicts, conflicts with family members at home, unhappy conflictual

marriage, can cause significant stress, especially when the individual desires to be understood by his friends, family and or spouse but often feels misunderstood. In addition, sudden death of a family member; or a loved one; divorce or separation from the partner can also evoke a lot of stress. Several factors that can make divorce or separation all the more stressful are holding oneself responsible for the failure of marriage; the need to justify the separation or divorce to family and friends; associated cultural and societal stigma; loss of valuable friendships; involvement of children; custody issues of children; court trials; readjustment to a single life and the need to from new friendships.

- **Frustration, threat and conflict:** Presence of frustration (i.e., any obstruction in one's way to achieve his goal); threat (i.e., fear of something negative happening or the fear of harm in future) and conflict (i.e., difficulty in deciding between available options) can be a major source of stress. High expectations, lack of ability and lack of resources (like time, money, support etc.) needed to achieve one's goal can cause immense frustration. Individuals having a negative cognitive bias, being high on anxiety and apprehension are more likely to experience threat when faced with uncertainty and hence may feel more stressful. Conflict can be of three types: approach-approach conflict (is a conflict between to desirable options); approach-avoidance conflict (arises when an individual has both positive and negative feelings towards a particular object or a choice in live) and avoidance-avoidance conflict (is a conflict experienced by the individual towards two undesirable options).
- **Major life events:** Some of the major life events that evoke stress are break up of relationship, death of a family member; presence of a chronic disabling illness in oneself or in his or her family; shifting of home, job; change in one's social status; significant financial loss etc. Holves and Rahe have devised a social readjustment rating scale (SRRS) by asking individual to assign a value to various events in terms of LCU (life changing units), indicating the amount of change an individual is requested to make in response these events. If stress inducing life events continue then, it can either lead to habituation or to chronic strain.

12.5.1 Moderators of Stress Response

The negative impacts of stress can be reduced by variables are resources, skills, behaviours, and traits. These variables help to cope with stress better than those who don't practice these coping skills or support.

Stress management refers to the use of various methods that have been designed to reduce the impact of potential stressful experiences. The various stress management techniques can be broadly divided into eastern and western techniques. The eastern techniques include—Meditation, Yoga, *pranayam*a and self-awareness

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(*Anashakti*). The western techniques include—— relaxation techniques (Jacobson's Progressive Muscle Relaxation Technique, Autogenic Training), biofeedback, assertiveness, time management, effective communication, etc. Let's study some of the major stress management techniques.

Meditation

The various relaxation techniques have their origin in meditation heritage of eastern religion. Earliest evidence of formal relaxation comes from origin of Hinduism in India between 3000 to 4000 BC. Religious rituals included interest in meditation. This meditation aspect represented the beginning of Yoga.

Meditation means directing one's attention to an object. It may provide direct accesses to inner conscious energies. For meditation one requires a quiet room free from distraction; a comfortable place to sit; a mental desire to focus one's attention and a passive attitude. It is effective as it slows metabolism, lowers blood pressure and reduces arousal.

Yoga

Yoga literally means to unite. It is the unity of physical and mental energies. It may mean different things to different people. For some it is a way to keep the body free from ailments by reducing stress but for some it's a way of life. It helps one to given better control one's intellect, emotion, and behaviour. Thus, it is prevention in nature.

Yoga prescribes some asana (bodily postures) to restore balance. *Asana* is a Sanskrit word meaning at ease and relaxed. *Shavasana* is the simplest asana and a quite effective relaxation technique. It requires a quiet room with subdued lighting free from distractions. In it, the individual is asked to lie down straight on his back by keeping his head in a comfortable position. He asked to focus on his breathing, on the air that passes in and out of the nostril. It focuses on passive observation of one's thoughts, which is quite difficult but essential, for total relaxation to take place. The individual is instructed to release tension from the body from time to time.

Those who cannot relax in *shavasana* because of its resemblance to a death body can benefit from *Makarasana* (crocodile position). Depending upon needs and capabilities of each individual different technique can be prescribed. Research has shown that it is effective in regulating blood pressure, anxiety, stress, insomnia etc.

Pranayama

It refers to breathing exercise. It is based on the principle that if one could harmonize breathing then on can alter lives thought, behaviour and emotion. In it, lungs take in air which is rich in oxygen and hence energies both body and mind.

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Self-awareness or *Anasakti*

It is an Indian concept based on self-realization / self-actualization. But it is a health promoting attitude that gradually develops. It is a relative concept. It is emotional detachment from something / someone. In spiritual love, it means detachment of the spiritual principal (basis of consciousness) from body and ego and body movement that create tension and interfere in lifetime function of internal organs & may result in psychosomatic illness.

Anasakti person tends to perceive his work as duty and shows lack of concern for the consequences of action. He appraises his own success and failure in objective rather than egoistic terms and is less governed by external standards like social approval and concerns. He doesn't insist on seeking pleasure or avoiding pain. He shows absence of egoism and maintains an emotional equipoise both in the face of positive and negative experience. He's a man of stable wisdom with little mood swings. He shows total absorption in the work / task at hand and shows heightened concentration, trying to make efforts towards achieving task excellence. The statement that 'this too shall pass' very well expresses the attitude of an anasakti person.

Relaxation technique

Relaxation is often misunderstood as simply rest or lying down. It is *rest after effort*, more accurately, *conscious rest after conscious effort*. Stebbins (1960) has very well-defined relaxation as – the complete resignation of body to law of gravity and of the mind to the law of nature. It involves the total energy transformation into deep dynamic breathing. It is both a means and an end to self-realization.

The main goal of relaxation is not to eliminate stressors or to prevent its recurrence by to increase one's tolerance. Through suitable for all people but when and how it is to be introduced varies from person to person. It possesses both curative and preventive characteristics.

For the relaxation techniques to be effective, they should be administered live by the therapist; the client should be told about its nature and how it works; clients should be motivated and encouraged to use it on regular basis; their benefits should be transferred to real life situations and the client should be made to see its several beneficial applications. Some of the relaxation techniques commonly used are Jacobson's muscle relaxation technique and autogenic training.

Biofeedback

It converts physiological response into electrical activity and provides a visual/ auditory feedback about them. It is based on the principle that when we make a response then feedback about the consequence of the response enables us to make appropriate adjustment. It requires making an individual aware of a metabolic

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response; drawing his attention to a signal that indicates desirable changes in internal responses; trying to control biofeedback signal and thereby controlling physiological responses and involves transferring control from laboratory to everyday setting. Two majorly used biofeedback technique are EMG (electromyography), which measures muscle tension and Thermal biofeedback, which measure skin temperature. It is based on the principle that under stress, blood vessels constrict, and temperature becomes cold.

The method of biofeedback has been criticized for being expensive; also, it is difficult to transfer control from laboratory to real life settings. Till date it is not certain whether the change is due to biofeedback only or anything else. One does not know how it exactly works and its effects are short lived.

Biofeedback has been found to be effective in treating chronic tension headaches, blood pressure, muscle tension and lower back pain.

Assertiveness training

Individuals who are unable to say 'NO' that is who are non-assertive are likely to experience stress as they are unable to express their feelings and tend to suppress their emotions like anger, hostility, disgust which are associated with chronic stress. Hence assertiveness training is likely to benefit the individual. Assertiveness training involves teaching individuals using modeling, instruction, rehearsal and feedback the assertiveness skills. Assertiveness training involves three components namely, refusal (the ability to say no for things that you do not wish to do), commendatory (i.e., the ability to express positive emotions), and request (i.e., asking someone to do things that help you to accomplish your goal).

Time management

It helps individuals to learn to prioritize their tasks and do them efficiently. It involves first making a list of the task that one needs to; rate them in terms of their importance; assign the amount of time you wish to spend at it and review how much you were able to achieve. Stress usually occurs when various tasks pile up and one is not able to finish them on time.

Effective communication or calming self-talk

It involves engaging in silent, relaxing, reasoning self– talk statement aimed at telling oneself that stress is temporary, and it shall soon go away. It also helps in reducing autonomous arousal such as telling oneself to count one to ten or instructing oneself to take a deep breath. It also helps individuals to preserve a sense of personal control, such as telling oneself that one handle the stress.

In short, individuals can learn to handle their stress effectively by making use of various above-mentioned stress management strategies.

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Check Your Progress

7. What do natural disasters as environmental stressors result in?
8. List the eastern and western techniques of managing stress.

12.6 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Stress is usually experienced in terms of three components, that is, emotion (such as anxiety or fear), thought (such as pessimistic self-talk) and behaviour (such as smoking).
2. The severity of stress is assessed by the degree to which it disrupts functioning.
3. At the stage of resistance in the General Adaptation Syndrome, the individual actively makes use of task oriented coping mechanisms and ego-defense mechanisms. Here, indications of strain may exist in the form of psycho-physiological symptoms and mild reality distortion. A shrinkage in the adrenal cortex; return of lymph nodes back to its normal size; sustaining of hormone levels; high physiological arousal; and heightened sensitivity to stress may also be seen.
4. The diathesis stress model proposes that an individual's susceptibility to illness and stress depends upon interaction between the biological factors (predisposition) and the environmental factors (precipitating factors).
5. Individual's tend to cope with stress at three levels——at the biological or the physiological level (through the use of immunological defenses and damage-repair mechanisms), the psychological or the interpersonal level (through the use of learned coping patterns, self-defenses, and support from family and friends) and at the socio-cultural level (though group resources, such as labour unions, religious organizations, and law-enforcement agencies).
6. Learned helplessness is a phenomenon, in which after experiencing a series of negative uncontrolled events, the individual comes to an understanding that he is helpless in the face of adverse circumstances and hence does not make effort to overcome his difficulties.
7. Natural disasters result in loss of property, money and life; broken relationships and the need to re-begin life from a scratch in its victims. Survivors of natural disasters sometimes suffer from Post Traumatic Stress Disorder (PTSD).
8. The eastern techniques of managing stress include—meditation, yoga, *pranayam*a and self-awareness (*Anashakti*). The western techniques

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include—— relaxation techniques (Jacobson's Progressive Muscle Relaxation Technique, Autogenic Training), biofeedback, assertiveness, time management, effective communication, etc. Let's study some of the major stress management techniques.

12.7 SUMMARY

- Stress at its optimum level can have adaptive and positive effects, for instance, it can increase one's tolerance for future stressors but continued exposure to severe stress can have more negative and damaging effect on one's physiological and psychological functioning, for instance, it can lower one's efficiency, cause depletion of adaptive resources, resulting in severe personality and physical deterioration-even death.
- According to Hans Selye (1956), there are two kinds of stress: **Eustress** (refers to stress caused by positive situations such as marriage, promotion etc.) and **Distress** (refers to stress caused by negative situations such as death, divorce, loss of a job etc.).
- While stress is considered a major cause of various mental and physical health problems, its effects is not always undesirable.
- Various factors that predispose a person to stress have been categorized based on the nature of stressor, person's perception and tolerance of stress and external resources and available social support.
- One person's stressor is another person's piece of cake. This difference in reaction to the same stressor by different people can be due to both a person's perception of threat and his or her stress tolerance.
- Hans Selye in 1936 was the first one to introduce the concept of stress and to systematically investigate the effect of continued severe stress on the body. He used the term General Adaptation Syndrome (GAS) to explain the concept of stress.
- The Lazarus model proposes that cognitive mechanisms are strong, and the demands of the situation can be easily met, then the individual doesn't experience stress. Stress is, however, experienced when the cognitive mechanisms are weak, or the stressor exceeds ones coping mechanisms. Lazarus believed that the experience of stress depends upon both the stressor and the cognitive appraisal of the stressor.
- The diathesis stress model proposes that an individual's susceptibility to illness and stress depends upon interaction between the biological factors (predisposition) and the environmental factors (precipitating factors).
- In order to effectively cope with stress, individuals are seen to engage in various coping strategies. Coping strategies refer to various cognitive, behavioral and emotional ways people engage in to manage stress. They

are dynamic processes which neither eliminate a stressor nor prevent its re-occurrence but increase one's tolerance of the situations.

- Environmental stressors refer to the stressors or factors which have a negative effect on the productivity of the ecosystem, its development as well as reproductive success. Such environmental stresses can be of natural origin or human induced. The environmental stressors can also be positive or negative in nature.
- Environmental stressors can be in the form of temperature related changes, climate change, chemical changes in the elements of the environment, competition, predation or parasitism between species. Therefore, examples of environmental stressors include a range of different things like wildfire, chemical pollution, thermal pollution, natural disasters like volcanic eruptions or tornados and hurricanes as well radiation spikes.
- Stress management refers to the use of various methods that have been designed to reduce the impact of potential stressful experiences. The various stress management techniques can be broadly divided into eastern and western techniques.

12.8 KEY WORDS

- **Stress tolerance:** It refers to a person's ability to withstand stress without becoming seriously impaired.
- **Environmental stressors:** It refers to the stressors or factors which have a negative effect on the productivity of the ecosystem, its development as well as reproductive success.
- **Coping strategies:** It refers to various cognitive, behavioral and emotional ways people engage in to manage stress.
- **Stress management:** It refers to the use of various methods that have been designed to reduce the impact of potential stressful experiences.

12.9 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the two kinds of stress?
2. List the advantages of stress.
3. Write a short note on a person's perception and tolerance of stress.
4. Briefly explain the concept of General Adaptation Syndrome (GAS).

5. What are the important implications of the Lazarus model of stress?
6. What is buffering hypothesis and direct effect hypothesis?
7. Write a short note on occupational stress.
8. What are the different types of conflict?

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Long-Answer Questions

1. What are the different factors on which the impact of a stressor depends?
2. Critically analyze Selye's theory of stress.
3. Examine Lazarus Model of Stress.
4. Describe the different coping strategies of stress.
5. Discuss the role of stress in understanding relationships.
6. Explain the moderators of stress response.

12.10 FURTHER READINGS

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UNIT 13 BEHAVIOURS DISTURBING ENVIRONMENTAL STRESSORS

Structure

13.0 INTRODUCTION

Environmental stressors refer to the factors that affect human beings and their ecosystem. These stressors disturb the equilibrium which has been maintained by the interactions of humans with the environment. In fact, they can be called as factors negatively affecting the relationship between humans and their environment. These stressors are not of a single category and can be studied as a part of different classifications including physical stressors, atmospheric stressors, psychological stressors, etc. All of this affect not only the physical health of humans but also their mental health. Some of these stressors occur naturally due to increased activities of humans but some are also induced by human behaviours and traditions. In this unit, you will learn about the different environmental stressors and their impact on humans.

13.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the different types of physical stressors
- Describe the types and effects of atmospheric stressors
- Examine the consequences of psychological stressors with special attention to noise

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13.2 PHYSICAL STRESSORS: AMBIENT TEMPERATURE LITTERING, HUMMIDITY, SUNLIGHT, WIND, AIR AND WATER AND ION CONCENTRATION

Physical stress is identified as the environmental and physical changes responsible for alterations in the homeostasis of the body. Human brain interprets various situations as alarming or non-alarming that trigger the physiological and behavioural response. To understand the concept of physical stressor, it is essential that we first look at its psychophysiological mechanisms, characteristics and major causes. Physical stressors—the tangible and measurable stressors —

- accident/trauma
- alcohol in excess
- circadian light-dark cycle/rhythms
- food
- infection/virus
- injury
- medication
- seasonal change
- poison
- surgery
- temperature extremes
- tobacco
- toxin
- travel

Physical stress is identified as the environmental and physical changes responsible for alterations in the homeostasis of the body. Human brain interprets various situations as alarming or non-alarming that trigger the physiological and behavioural response. . It has an impact on other body systems like our behaviour, the immune system, cardiovascular responses and the gastrointestinal tract.

The effect of stress may vary according to age and sex. Individual variations play a major role. For example, in case of women, events like pregnancy has a huge impact on the female body, as the body is under constant physical stress due to changes in stress hormone, her respiratory rate decreases, excessive need of oxygen, increased blood pressure and increase insulin resistance which results in increased blood glucose level, change in body weight, total body water, plasma proteins, body fat, and cardiac output.

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Negative physical stress

Any physical stressor that triggers HPA axis (hypothalamic–pituitary–adrenal) for a longer time period and surges the stress hormonal level, which further leads to tension and finally to illness, pain, unpleasant feelings, anxiety decreased performance and overexertion is termed as negative physical stress.

Chronic/Negative physical stress which lasts for weeks or months can decrease the strength of the immune system. It can lead to hypertension, depression, fatigue and gastrointestinal problems and even cardiological diseases.

Positive physical stress

Any physical stressor which triggers the HPA axis for a shorter time period and provides feelings of enthusiasm and enjoyment, as well as consideration and energy for deadlines is known as positive physical stress. exercising such as jogging or lifting weights entering new situations, motivation for new challenges and achieving maximum performance etc. are all example for positive physical stress. Researchers believe that some amount of stress can enhance the strength of the immune system. For example physical stress can get better functioning of heart and protect our body from infections. Individuals with a moderate or optimal level of stress have a progress rate better than ones with low or high stress levels.

Psychophysiology of Physical Stress

Internal balance in our body is gets disrupted at times due to the external disturbance in our body. Some of the internal disturbances include increased heart rate, blood pressure and respiration and heart pump more blood to the muscles, supplying more oxygen to the muscles and heart and lung system, allowing rapid energy use, and accelerating metabolism for emergency actions. Increased sugar rates in the blood, thickening of the blood to increase oxygen supply, facilitating better defence from infections and to stop bleeding quickly, prioritizing increased blood supply to peripheral muscles and heart, to motor and basic-functions regions in the brain; decreasing blood supply to digestive system and irrelevant brain regions, this also causes secretions, leaving the body lighter.

Physical Stress Stressors

Let us have a look at the major physical stressors and their impact in this section.
Noise: The most commonly encountered stressor is *noise* produced by urban traffic, aircrafts, from work environments and household appliances. It disrupts the activities and balance of life. It causes psychological and physiological or behavioural changes in people. Long term experience to unavoidable noise stress induces exhaustion, defeat, annoyance followed by decreased muscle movement, social contacts and mood changes.

Pregnancy: Pregnancy brings dynamic changes in the body's internal functioning. It results in increased basal oxygen consumption and changes in the energy substrate

use by different organs, including the feto-placental unit. From early pregnancy the human placenta influences maternal homeostasis.

Exercise: The duration and types of exercise aerobic and anaerobic can cause stress in the body. *Aerobic exercises* use arm and leg muscles and give the heart and lungs a continuous workout. *Anaerobic exercises* not only build and tone muscles but are also not beneficial to the heart and lungs because our body builds lactic acid, which causes uneasiness and fatigue at sustained levels. Production of lactic acid is the major reason why anaerobic exercise or high intensity exercise happen in short bursts**.** Physical activities are very much stressors that affect the body's physiological stress systems.

Temperature: Temperature change is one of the major stressors. It disturbs the bodily physiology. Proper functioning of the nervous system is important in thermoregulation; the process of homeostasis and temperature control are central to hypothalamus. The hypothalamus maintains the set point for body temperature through reflexes. It causes vasodilation and sweating when the body is too warm and shivering when the body is too cold. However, if these processes occur for a long period of time it may cause physical stress.

Ambient temperature: The ambient temperature is the average air temperature surrounding something (such as a person) whether inside or outside. In relation to weather, the ambient temperature is the same as the current air temperature at any one location.

Exhaustive exercise in a hot environment can impair performance. That is why gyms or yoga centres have air conditioners, to maintain the right body temperature. It is also advised to have cold water while exercising. Higher epinephrine plasma levels occur during exercise in heat, indicating greater sympathetic activity.

Physical activity induces physiological adjustments to support bodily changes during exercise. These adjustments vary with:

- the duration
- types and intensity of exercise
- training level
- environmental conditions
- The analysis of salivary components such as total protein

Littering

Litter refers to any kind of trash thrown in small amounts, especially in places where it doesn't belong. It portrays a bad picture of an area. This practice is unlawful because annually it costs municipality's huge amount for clean-up. The most frequent littered stuff includes fast food packaging, cigarette butts, used drink bottles, chewing gum wrappers, broken electrical equipment parts, toys, broken

glass, food or green wastes. Littering is a dangerous activity which should not be taken lightly for the reason that it impacts the environment in multiple ways.

Various causes of littering

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The various causes of littering.

- **Presence of litter in an area**

  The researches point out that when someone sees litter already accumulated somewhere, it gives him the impression it is alright to discard items in such area, so they throw their garbage there, in turn making the place dirtier.

- **Construction projects**

  Pieces of wood, metals, plastics, concrete debris, cardboard, and paper are few common waste materials that are generated at a construction site. Waste produced by workers along with building waste contributes to the waste from construction projects.

- **Laziness and carelessness**

  Attitudes of carelessness and laziness lead to littering in unwanted places. Throwing trash from the balconies or from car windows are examples of such behaviour.

- **The belief that there is no consequence for littering**

  Examples of such behaviours include pedestrians getting rid of wrappers and other wastes on the roads and streets, motorists throwing garbage from their cars and many others. A belief that stays common for such people is that there are people who are responsible for cleaning their waste.

- **Lack of trash receptacles**

  People in the urban areas blame rampant littering on the unavailability of sufficient trash cans. The garbage bins are either non-existent or poorly maintained leading to over loading. Animal scavengers and wind also lead to scattering of the waste in the garbage bins.

- **Improper environment education**

  Lack of knowledge and awareness about the consequences on the part of the people is also a major cause of littering practices followed by them.

- **Low fines**

  The fines for littering in many countries are quite low and, in many places, there are no provision for fines at all. People are ready to pay the amount of fine but are not ready to pick it.

- **Pack behaviour**

  As per psychology, it is in human nature to get affected by the people we spend time with, even unconsciously. Their attitude affects us eventually, either we become like them or they adopt our habits. So, when we see

others around us littering, we sort of see it as an approval or see it as acceptable behaviour.

Serious problems of littering

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The problems related to littering are as follows:

- Causes physical harm or injury to people
- Facilitates the spread of disease
- Pollutes the environment
- Incurs high clean-up costs
- Affects and may kill wildlife
- Affects aesthetic value and local tourism
- Increases probability of fires
- Becomes breeding ground for insects
- Causes soil pollution
- Leads to air pollution

Consequences of littering

The consequences of littering are as follows:

- It has negative consequences for the environment.
- It can lead to toxic materials or chemicals in litter to be blown or washed into rivers, forests, lakes and oceans, and, eventually cause pollution.
- It degrades the air quality because of the odour and toxic/chemical vapor emanating from it.
- It leads to pollution in the environment and increase in the spread of diseases.
- It contaminates the toxic chemicals and disease-causing microorganisms in the trash which may lead to pollution of the water systems and spread water-borne diseases when such water is consumed.
- Even the small and seemingly unharmful wastes like cigarette butts take a grand total of ten years to decompose because of cellulose acetate, contrary to the common perception that cigarette butts decompose very quickly in only a matter of days. The cigarette butts contain toxic substances like arsenic which can pollute soil and water and are hence harmful to the environment.
- Plastic litter is harmful for the environment and its inhabitants.
- It has great costs for the country, society as well as individuals not just from the cleaning perspective but also from the health and pollution angles. The large sum of money required to clean up litter comes from the taxpayers and which should ideally be used in a more productive manner.

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Possible solutions to littering to save our environment

Some of the solutions to littering are as follows:

- **Litter laws**: Putting in place strict litter laws and making sure there are no loopholes in it, ensures no litter is discarded, thrown or dropped onto private and public areas.
- **More control measures**: Due to lack of controlling instances and the general nature of people to practice the same, there is no appropriateness in the manner in which littering is controlled or fined. Hence increasing stricter fines and punishment would create a sense of fear among the people.
- **Anti-litter campaigns:** Clean up drives can be organized with friends and neighbours in order to create awareness. Community programmes with the aim of anti-littering can be formed.
- **Stop littering signs:** Relevant signs can be placed in areas that are prone to littering such as market areas or streets near public stations.
- **Putting up litter bins:** Installation and regular management of garbage bins at all the possible places must be ensured by local authorities.
- **Education:** Mitigating the issues can be facilitated by educating people and spreading awareness about the consequences of their actions.
- **Involving children and youth:** The young generation is more receptive towards change and has a significant role in building a changed society. Hence, involving them in such activities will help lay a strong foundation for a better future.
- **Recycling of waste:** Reusing the items which are possible to be reused and recycling the waste products are practices which have long term benefits.
- **Carry a litter bag:** Carrying a personal litter bag to store the garbage till a trashcan is nearly available is a practice that can help one be organised and in keep the streets litter-free.

Humidity

Humidity, water vapour in the air, plays an important role in controlling the temperature of a place. Without water vapour in the air, our climate might be like the climate on Mars. Too much or too little humidity can be dangerous. For example, high humidity combined with hot temperatures is a combination that can be a health risk, especially for the very young and the very old.

In a given environment, humidity is one of the determining factors based on which particular flora and fauna can thrive. It affects human beings, animals, and plants. The human body depends on perspiration to get rid of excessive heat. During high humidity, evaporation of sweat from the body is reduced.

The effect of humidity should be considered as an important factor separately for researching the birth and death rates of insects. This is because the survival of

insects is mainly based on the effect of water content. This should be kept within certain limits, exposure to extremely dry or extremely humid conditions may be harmful. The effective birth rate of an insect population may be taken as the rate at which reproducing females are added to it. There are two ways in which this rate may be affected:

(1) Through effects on the rate at which the progeny is produced

(2) Through effects on the rate at which the offspring reaches sexual maturity.

The survival of insects depends on their maintaining a balance between the losses and gains of water so that the water content is kept within certain limits. Survival in the field is also affected by humidity in several instances, and circumstantial evidence suggests that death is a common occurrence in many species due to erratic humidity.

Why does humidity happen?

Water in liquid form is essential to life. The evaporated water vapour has a critical role to serve within the environment.

Distribution of water to various parts of the earth for various needs is accomplished by the water cycle. Evaporation of water from the earth adds up to be one third part of the water cycle without which formation of clouds and precipitation would not be possible.

How do we measure humidity?

There are two different ways of calculating humidity both in terms of absolute and relative form. Each method has its own uses:

- **Absolute Humidity:** It is simply the total mass of water vapour in a given volume of air, regardless of the temperature. Scientifically, it is the most "accurate" measurement of humidity.
- **Dew Point:** It refers to the 'the atmospheric temperature (varying according to pressure and humidity) below which water droplets begin to condense and dew can form.' Condensation only occurs when there's enough water vapour in the air for the molecules inside the vapor to coalescence into water droplets. The only way that happens is if water vapor condenses faster than it can evaporate.
- **Relative Humidity:** It is a percentage measurement of water vapour saturation relative to maximum saturation. In other words, relative humidity is the measure of closeness of the air temperature to the dew point. 100% relative humidity would imply that the air temperature is equal to the dew point.

Sunlight

Sunlight comprises of electromagnetic radiations, primarily in the form of infrared, visible and ultraviolet rays, which are radiated by the sun. The earth's atmosphere

helps in scattering and filtering of the sunlight which is seen as daylight when the sun is above the horizon.

Health Benefits of Sunlight

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The health benefits of sunlight are:

- Improves sleep
- Reduces stress
- Maintains strong bones
- Helps keep the weight off
- Strengthens your immune system
- Fights off depression
- May contribute to greater life expectancy

Sunlight and Your Health

Decreased sun exposure is associated with a drop in the serotonin (happy hormone) levels, which can lead to major depression with seasonal pattern. The sunlight has an effect of triggering the serotonin levels when it goes through the eyes. This is to say that sunlight triggers special areas in the retina, which then induces the release of serotonin. Due to this connection of serotonin and sunlight, one of the main treatments for seasonal depression is light therapy, also known as phototherapy. In many studies, anxiety related disorders and panic attacks are also being linked with changing seasons and reduced exposure to sunlight.

Exposure to sunlight can also benefit those with:

- Other types of major depression
- Premenstrual dysphoric disorder
- Pregnant women

Wind

Moving air is known as wind which cannot be seen, only felt. Wind makes its presence known during events like windstorms. The cause of the air movement are the differences in air pressure within the atmosphere. Air moves from high pressure areas to low pressure areas. Speed of the wind also depends upon this difference of pressure. This wind is powerful enough to lift roofs off buildings, blow down power lines and trees, and cause highway accidents as gusts can push around cars and trucks.

Wind acts as a powerful erosion and transportation agent when it is strong, it blows across fine grained sediment such as sand, silt, and clay. A wind’s bed load consists of the heavier grains (usually sand) that hop and skip along the ground by saltation which rarely rise more than 1 meter (3 feet) into the air when transported. Let’s look at some of the physical stressors of the wind:

- **Dust storms:** Factors upon which dust storms that blow out the dusts depend are the number of fine grained particles present and wind speed. The dust particles can be carried in both upwards and lateral directions about thousands of feet in height and several miles in length.
- **Deflation:** Deflation is the process of sediment removal from the surface of land due to the action of wind. It can lead to a situation called blowout which is lowering the surface of land in the form of a bowl like depression.
- **Sand dunes:** Heaps of unconsolidated sand are known as sand dunes which form a classic characteristic of the great desert environments. The wind's direction changes the shape of the sand dunes. The steeper, downwind slope is known as the slip face.

These are visible at places with sand such as desert regions or along sandy coastlines and beaches. The material of dune varies in composition and includes sand size grains of quartz, feldspar, calcite, gypsum, and rock fragments that are well sorted and well rounded.

Air and Water

Water is a very powerful medicine. Many refer to it as the blood of the holy sacred mother, Mother Earth. This can make a flower beautiful, make a tree grow tall, make each and every person spiritual, holy, sacred.

Uses of air and water

- Sustain life and growth
- Combustion
- Maintain temperature
- Supply energy
- Photosynthesis

Properties of air

- It takes up space
- It has mass
- It is affected by heat
- It exerts pressure
- It can be compressed
- It is affected by altitude

Ion Concentration

The concentration of hydrogen ions in a solution is usually expressed in moles per litre or in pH units and used as a measure of the acidity of the solution. Excessive and insufficient levels of ion levels are problematic for humans. Increased positive

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ion levels in the air is linked with the condition called ion poisoning. It could lead to increased stress response in human bodies and increased serotonin. On the other hand, increased negative ion levels have been linked to be useful for humans in the sense that it leads to decreased stress levels, irritability, increased relaxation and decreased tiredness.

Check Your Progress

1. How does stress affects the human body?
2. What does negative physical stress lead to?
3. Name the phenomenon without which the formation of clouds and precipitation would not be possible.
4. List the benefits of sunlight.

13.3 THE ATMOSPHERIC STRESSORS: CARBON-DIOXIDE, CARBON-MONOXIDE, OZONE AND TOBACCO SMOKE AS A POLLUTANT

Reaction to everyday stressors can be significantly hindered by atmospheric stressors since they compromise the effectiveness of the immune system resulting in declining health and level of happiness among people.

Atmospheric Environment Stressors Explained

Atmospheric stressors can hinder an individual's capacity to deal with various other stressors. Examples include:

- Air pollution, and smog or smokestacks (visible signs of air pollution)
- Extreme temperatures, such as freezing cold or scorching heat
- Humidity

The Assault on Health

Increased amount of exposure to air pollution and various other environmental stressors present in the atmosphere can deteriorate health. Some people may not even be aware of such stressor, but their immune systems and other body systems are trying to save them from the attack of these stressors.

Coping Tactics

Exercise and following a nutritious diet can help to win the battle against atmospheric stressors because a healthy body and mind are able to deal with these stressors better than an unhealthy body.

Distressing Signs

The matter of concern arises from the understanding whether or not atmospheric environmental stressors play have a negative impact on the immunity of an individual and upon the way an individual deals with those stressors; the question of whether the mere presence of stressors has enough capacity to elicit stress causing psychological and physiological reactions is also of great significance.

Carbon dioxide

An ever-increasing levels of carbon dioxide are seen as an environmental stress for several reasons. Plant-level studies have shown that elevated CO_2 is likely to ameliorate mild drought, salinity, UV-B, global change and ozone stresses, to exacerbate nutrient stress, and to interact with temperature in a complex fashion. It is also considered to be a pollutant for its role as a green house gas, it leads to heating up of the ground and oceans which reduces their ability to absorb carbon dioxide. This when compounded becomes a major cause of global warming. Excessive carbon dioxide also combines with moisture in the air to result in acid rains which are very dangerous. Increase carbon dioxide in closed areas is also a major cause of indoor air pollution which makes breathing difficult along with causing problems such as headaches, etc.

Carbon monoxide

Carbon monoxide (CO) is a tasteless, colourless and odourless gas which is a danger to both our environment and is highly toxic for human beings. Carbon mono-oxide comes out of exhaust of vehicles and generators and is called as a silent killer. It gets this name as excessive inhalation of it is lethal, as it poisons the nervous system and heart. Interestingly, one research had found that low levels of carbon monoxide may actually have a narcotic effect that helps city-dwellers cope with environmental stress in an urban setting.

Ozone

Ozone damages vegetation and ecosystems by inhibiting the ability of plants to open the microscopic pores on their leaves to breathe. It interferes with the photosynthesis process by reducing the amount of carbon dioxide the plants can process and release as oxygen. Elevated levels of ozone are seen to lead to reduced agricultural crop and commercial forest yields, reduced growth and survivability of tree seedlings, and increased susceptibility to diseases, pests and other stresses such as harsh weather.

It not only has a detrimental effect on plants, but breathing ground-level ozone can further trigger a variety of health problems in humans such as chest pain, coughing, throat irritation, and congestion. It can worsen bronchitis, emphysema, and asthma and can reduce lung function and inflame the lining of the lungs. Repeated exposure to ozone can even lead to a permanently scar lung tissue.

Tobacco and Tobacco smoke as a pollutant

A person having asthma can be affected by outdoor air pollution and smoking tobacco. Increased levels of ozone, particulate matter, and tobacco smoke have been associated with increased asthma symptoms and health care use and with reduced lung function. Tobacco smoke is considered to be bad for not just asthma patients but other non-smokers too. It can lead to many different lung diseases, heart attacks, congenital diseases in case of pregnant women smoking, etc. Some recent studies are also claiming that in some areas, the level of tobacco smoke is far worse than the emission from diesel cars. Tobacco smoke releases carbon dioxide and methane to the general atmosphere.

Use of Tobacco accounts for nearly 10% of annual deaths worldwide. Tobacco growing is associated with environmental and occupational health concerns. Deforestation for tobacco growing is known to have serious environmental consequences such as loss of biodiversity, soil erosion and degradation, water pollution and increases in atmospheric carbon dioxide.

Tobacco growing also involves considerable use of chemicals such as pesticides, fertilizers and growth regulators, which when get mixed with drinking water sources can have a detrimental effect on humans.

Tobacco crops are also seen to deplete soil nutrients by taking up more nitrogen, phosphorus and potassium than other major crops.

Intensive lobbying and investments by multinational tobacco companies (e.g. Philip Morris International, British American Tobacco and Japan Tobacco International) and leaf buyers (e.g. Universal Corporation and Alliance One International) along with market liberalization measures have encouraged the expansion of tobacco agriculture in low- and middle-income countries. This has also encouraged unfair labour practices in tobacco agriculture, where a lot of children are also seen involved in tobacco farming, who are at a much greater risk for nicotine toxicity.

Global tobacco manufacturing has been estimated to produce over 20 lakh tonnes of solid waste and three lakh tonnes of non-recyclable nicotine waste and 2 lakh tonnes of chemical waste. Cigarette butts are the most commonly discarded piece of waste globally. Cigarette butts contain harmful substances such as arsenic, lead, nicotine and ethyl phenol, which often get discarded into aquatic environments and soil, thus acting as a potential human health hazard through bioaccumulation in the food-chain. Electronic cigarettes may contain batteries that require special disposal as well as chemicals, packaging and other non-biodegradable materials. In addition, consumption of tobacco is associated with increased risk for lung cancer, cardiovascular disease and pulmonary disease. Cigarettes have also been to cause several accidental fires, thus resulting in deaths.

Interestingly, tobacco smoking leads directly to the emission of 2 600 000 tonnes of carbon dioxide and about 5200000 tonnes of methane.

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Check Your Progress

5. How does ozone damage vegetation?
6. What are the environment consequences due to deforestation for tobacco growing?

13.4 PSYCHOLOGICAL STRESSORS AND NOISE

The matters of adaptation, dysfunction and disease can be understood using the concept of psychological stressors. The term 'psychological stressors' is used refer to the social and physical aspects of the environment which exceed the availability of resources and adaptive capacity of an organism. The situations that constitute these stressors consist of wide array of circumstances that have common and specific psychological as well as physical attributions to them. In this section, we will be focussing on noise as a stressor.

Noise

Anderson defines noise sensitivity as a 'general measure of attitudes toward noise'. Research have shown that more than noise, noise sensitivity is more closely related to detrimental effects on one's physical and mental health. It can cause skin and mental diseases. J. Tiffin defines noise as a disagreeable sound to a human which disturbs his or her everyday activities. According to Harrell, noise is an unwanted sound that increase fatigue and under some industrial conditions causes deafness. Similarly, in terms of environment health, noise is an unwanted sound that may adversely affect the health and well-being of an individual.

The Environment Protection Act of 1986 defines noise as an environmental pollution and requires the Central government to make rules prescribing the maximum permissible limit of noise in different areas. There are several factors that are responsible for noise pollution as follows:

- **Urbanization:** Rapid growth of urbanization has created a major problem of noise pollution which is affecting the quality of human life.
- **Industrialization:** Rapid advancement in science and technology has also led to the problem of noise pollution which is proposing a serious challenge today.
- **Growth in population:** It has led to growing noise pollution in residential areas.
- **Non-cooperation of governmental agencies:** In terms of implementing laws to control noise pollution.
- **Customs, festivals and religious ceremonies:** It includes noise created due to *melas* (fairs), playgrounds, political gathering, Ramayan

Paaths, Akhand *Paaths*, offering of Azan Prayers, etc., are the main factors responsible for noise-pollution.

- **Industrial Sources:** It includes noise from various industrial operations in cities, like boilers, machineries, foundries, flour mills, cutting machines, etc. Noise pollution is also caused due to big machines working at high speed having high-noise intensity.
- **Non-Industrial Sources:** are as follows:

  Loudspeakers which are used in several functions at odd hours can create big annoyance to the public at large. In addition, frequent use of loudspeakers by Temples, Mosques, Churches, Gurdwaras and other place of worship are also believed to increase noise pollution and its occurrence is increasing day-by-day.

  Construction works which involves the use of huge machines for demolition of old sites and construction of new building causes a lot of noise.

  Automobiles: Today, vehicles densities have become alarmingly high contributing to nearly 60 to 70 per cent of noise pollution in cities.

  Trains: Steam and diesel engines commonly used by railways produce lot of noise, having a much greater impact in residential areas.

  Aircrafts: The higher speed of an aircraft is the greater noise polluter. The supersonic aircrafts have added more noise especially for populations who live near aerodromes. The noise from these planes can break window-panes, crack plaster and shake buildings.

  Projection of Satellites in Space: High explosive rockets are used to launch satellites can cause lot of noise.

Noise and noise sensitivity have negative effects on mental health and are associated with serious health risks such as heart attacks, strokes and hypertension. Exposure to noise is also seen to reduce learning and increase anxiety in children and adolescents. Noise can also be a great source of hindrance in the learning ability of a child. Constant background noise can also lead to reduced ability to understand words that the child already knows and can impair one's ability to learn new ones.

Several studies have shown that noise pollution is linked to anxiety, depression, high blood pressure, heart diseases and strokes. Constant noise can make a person really anxious, and act as a trigger for panic attacks and depression.

The stress hormone called cortisol is released in greater amount in people who are exposed to continuous or chronic exposure. Presence of high level of this hormone in our body can have a negative effect on our physical and mental health.

Exposure to noise can also result in sleep disturbances which can make one vulnerable to heart problems, diabetes, obesity etc.

Long term exposure to noise can also result in some personality changes such as it can make people irritable, cranky, violent and aggressive. It can impair their ability to focus and concentrate on various cognitive tasks which may make them engage in silly mistakes or may make them forget things, thus creating havoc and increases stress levels even higher. In short it can impair one's quality of life.

In addition, children and adolescents have been seen to be more significantly affected by noise compared to adults as their ability to cope with stress is relatively less. Also, road-traffic noise in residential areas is significantly associated with greater number of behavioural problems in children such as emotional problems, conduct problems and increased hyperactivity. Behavioural problems in children and adolescents further lead to impairments in social skills, self-confidence, and peer relationships, thus, negatively affecting their educational and occupational opportunities.

Noise sensitivity rather than noise has also been found to be predictive of adults' mental health, as manifested in depression, anxiety, insomnia, and stress

Children and adolescents from low-income families tend to show a higher magnitude of association between noise sensitivity and behavioural problems than those from high-income families. Children in low-income families are more likely to experience multiple physical and psychosocial stressors which have an impact on mental health.

Noise in Different Settings

Now that you have learnt about the problems which may be attributed to noise. Let's have a look at the issues which arises with noise acting as a stressor in different settings.

Noise in workplace

Noise is a common environmental stressor in the workplace, which is known to negatively affect both worker's well-being and satisfaction with work, work performance and motivation.

Noise in living condition

Exposure to high levels of noise in our living conditions, directly effects our auditory system (e.g., hearing loss and tinnitus induced by exposure to high levels of noise), and is associated with increased levels of mental stress and cardiovascular complications. According to recent estimates of the World Health Organization, exposure to traffic noise is responsible for a loss of more than 1.5 million healthy life years per year in Western Europe alone, a major part being related to annoyance, cognitive impairment, and sleep disturbance.

Noise-induced mental stress has also been associated with increased stress hormone levels, blood pressure, and heart rate, which further increases the risk of cerebro-cardiovascular disease such as stroke, arterial hypertension, ischemic heart disease, and myocardial infarction.

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Exposure to traffic noise has also been found to be associated with mental health symptoms and psychological disorders such as depression and anxiety, which further increase maladaptive coping mechanisms. It can increase stress hormone levels, thereby triggering inflammatory and oxidative stress pathways by activation of the nicotinamide adenine dinucleotide phosphate oxidase, uncoupling of endothelial/neuronal nitric oxide synthase inducing endothelial and neuronal dysfunction. It can also have systemic health effects.

Research has shown that low-level noise exposure interferes with communication, disturbs daily activities, and disrupts sleep, leading to sympathetic and endocrine activation and a number of cognitive and emotional reactions, including annoyance, depression, and mental stress. Exposure to noise over a long period of time, is also associated with increased blood viscosity and blood glucose, and activation of blood clotting factors and the subsequent manifestation of cerebrocardiovascular disease such as stroke, ischemic heart disease, acute myocardial infarction, heart failure, and arterial hypertension. Loud noise can damage hair cells in the ear.

Laboratory noise and social behaviour

Research has found that human-generated sounds may affect behavioural patterns of fishes, both in natural conditions and in captivity by changing group cohesion, swimming speed and swimming height.

Noise in school and hospital

Several studies have found that hospital are noisy places and so much noise in hospital can have a negative impact on the mental and physical health of the patients.

Exposure to lot of noise in hospitals have been found to be associated with reduced intelligibility of speech, impaired communication, increase in annoyance, irritation, and fatigue, significant sleep disturbances, poor post-hospitalization recovery, increased pain sensitivity, high blood pressure, poor mental health and reduces the quality and safety of healthcare.

Hospitals can curb the problem of noise pollution by focusing on reducing repetitive sounds like dripping water that can cause stress, by asking patients about which sounds annoy them the most and by briefing patients and their friends and relatives on noise pollution levels before admitting them.

Noise and Law

The problem of noise pollution can be tackled under the criminal law as well. Noise is considered as public nuisance under Section 268 of the Indian Penal Code and thus, there is a criminal liability of a person relating to his illegal omission resulting in common injury, danger or annoyance to the people in general.

Legal Provisions Regarding Control Of Noise Pollution

In India, matters related to the environment became more significant in the Sixth Five Year Plan (1980-1985). Later a separate Department of Environment (DOE) was created to tackle the ecological crisis problems. The Bhopal gas tragedy of 1984, revealed several inadequacies in our safety and environmental legislations, and made our government more vigilant about protecting environment. This later led to major changes and new enactments in the following laws were included:

I. 1987 amendments to the Factories Act, 1948 and the rules;
II. Enactment of a new Environment (Protection) Act 1986 and a series of rules; under, including 1992 amendment to Environment Protection Rules;
III. Manufacture Storage and Import of Hazardous Chemical Rules, 1989;
IV. The Public Liability Insurance Act, 1991;
V. Revised Motor Vehicle Act, 1988;
VI. Central Motor Vehicle Rules, 1989 with latest amendments;
VII. Narcotic Drugs and Psychotropic Substance Act, 1985;
VIII. The Bhopal Gas Leak Disaster (Processing of Claims) Act, 1985;

Unfortunately when it comes to controlling noise pollution, no effective and elaborate laws seem to be there in India. However there are some of the following laws for directly dealing with the issue of noise control but often sadly they are not implemented well.

Control of Noise Pollution Under the Criminal Law

Noise is considered as public nuisance under Section 268 of the Indian Penal Code and a criminal liability could be put on a person who causes annoyance to people in general.

In addition, under Section 290 of Indian Penal Code, a person who causes public nuisance can be punished with a fine which may extend to two hundred rupees. If any individual suffers any loss of hearing or any other hurt or injury on account of any act done on the part of the government in exercise of its non-sovereign functions then the government can be held liable for damages under Article 299 of the constitution of India.

- **Motor Vehicles Act, 1988** provides certain restrictions on noise produced by horns and it also requires a silencer to be fitted with every motor vehicle.
- **The provisions of Criminal Procedure Code, 1973** (Cr. P. C) can also be invoked to prevent the pollution of almost all kinds, including noise pollution. Under S.133 and S.144 of Criminal Procedure Code, the Executive Magistrates have been authorized to issue certain conditional orders to remove, prohibit or regulate any public nuisance or any trade

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or occupation, injurious to health or physical comfort of the community as noise.

- **Aircraft Act 1934** suggests that aerodromes be constructed away from residential areas of a city in order to protect residents from noise created by frequent take-off and landing. This can be seen as a step to minimize the impact of noise pollution on the people living in residential areas.

  Under the Indian Aircraft (Public Health) Rules, 1946, there is a statutory duty of the factories to provide adequate measures for the control of noise.

- **The Police Act, 1861**: regulates the extent of which music may be used in streets on the occasions of festivals and ceremonies.
- **The Environment (Protection) Act, 1986 and the Environment (Protection) Rules, 1986:** provides for the maximum allowable limits of concentration of various environmental pollutants (including noise) pollution in different areas. It also provides the noise standards for firecrackers and it prohibits the manufacture, sale or use of firecrackers generating noise level exceeding 125 db(A) or 145 db(C) at 4 meters distance from the point of bursting.
- **Noise Pollution (Regulation and Control) Rules 2000:** framed by the Central Government under the provisions of Environment (Protection) Act, 1986 considers it necessary to regulate and control noise producing and generating sources with the objective of maintaining the ambient air quality standards in respect of noise. Under this act, one can only make use of loudspeakers after obtaining written permission from the competent authority. And if anybody causes noise pollution in any place that is covered under the silence zone are liable for penalty.

There are several drawbacks in these acts, as follows:

- Present rules under the Act does not cover the whole area for controlling of noise pollution. It only covers the noise of loudspeakers and amplifiers within the area of its operation. The noise of aircrafts, trains, domestic animals, transport, industry and commercial establishments has not been covered by the rules.
- The punishment provided under the act are not serious enough thus making the law inadequate.
- There are no provisions made under the Rules for public awareness, public participation or public coordination for controlling the noise pollution.
- There is wide gap between the Act in theory and its implementation in practice.

- There is lack of adequate coordination between different departments of government to control noise pollution.
- There are no provisions for permanent restrictions on noise producing areas for controlling of noise pollution.

There are several factors that are responsible for the ineffectiveness of these laws as follows:

- Presence of a wide gap between law in theory and its implementation in practice.
- Illiteracy and unawareness among general public about the problem of noise pollution
- Non-cooperation from the public towards control of noise pollution.
- Inactive role of Judiciary to control or curb the problem of noise pollution.
- Inadequate laws for controlling of noise pollution.
- Rapid growth of urbanization and industrialization.
- Ineffective laws to prevent pollution of environment by automobiles, loudspeakers and other innumerable sources of noise.
- Customs, festivals or religious ceremonies.
- Political interference in pollution control matters

We all need to work actively on these areas if we want our mother earth to be a peaceful planet and is we wish to enhance the quality of our life.

Check Your Progress

7. What is exposure to a lot of noise in the hospitals associated with?
8. Which Section of the Indian Penal Code deems noises as a public nuisance?
9. Name the Act/Rules under which one can make use of loudspeakers after obtaining written permission from the competent authority.

13.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Stress affects the central nervous system which modulates the activity of steroid, catecholamine, peptide and opioid systems. It has an impact on other body systems like our behaviour, the immune system, cardiovascular responses and the gastrointestinal tract.
2. Chronic/Negative physical stress which lasts for weeks or months can decrease the strength of the immune system. It can lead to hypertension, depression, fatigue and gastrointestinal problems and even cardiological diseases.

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3. Evaporation of water from the earth adds up to be one third part of the water cycle without which formation of clouds and precipitation would not be possible.
4. Health benefits of sunlight are as follows:
   - Improves sleep
   - Reduces stress
   - Maintains strong bones
   - Helps keep the weight off
   - Strengthens your immune system
   - Fights off depression
   - May contribute to greater life expectancy
5. Ozone damages vegetation and ecosystems by inhibiting the ability of plants to open the microscopic pores on their leaves to breathe. It interferes with the photosynthesis process by reducing the amount of carbon dioxide the plants can process and release as oxygen.
6. Deforestation for tobacco growing is known to have serious environmental consequences such as loss of biodiversity, soil erosion and degradation, water pollution and increases in atmospheric carbon dioxide.
7. Exposure to lot of noise in hospitals have been found to be associated with reduced intelligibility of speech, impaired communication, increase in annoyance, irritation, and fatigue, significant sleep disturbances, poor post-hospitalization recovery, increased pain sensitivity, high blood pressure, poor mental health and reduces the quality and safety of healthcare.
8. Noise is considered as public nuisance under Section 268 of the Indian Penal Code.
9. Under the Noise Pollution (Regulation and Control) Rules 2000, one can only make use of loudspeakers after obtaining written permission from the competent authority.

13.6 SUMMARY

- Physical stress is identified as the environmental and physical changes responsible for alterations in the homeostasis of the body. Human brain interprets various situations as alarming or non-alarming that trigger the physiological and behavioural response.
- Internal balance in our body is gets disrupted at times due to the external disturbance in our body. Some of the internal disturbances include increased heart rate, blood pressure and respiration and heart pump more blood to the muscles, supplying more oxygen to the muscles and heart and lung system, allowing rapid energy use, and accelerating metabolism for emergency actions.

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- The most commonly encountered stressor is *noise* produced by urban traffic, aircrafts, from work environments and household appliances.
- Pregnancy brings dynamic changes in the body's internal functioning.
- The duration and types of exercise aerobic and anaerobic can cause stress in the body.
- Temperature change is one of the major stressors. It disturbs the bodily physiology. Proper functioning of the nervous system is important in thermoregulation; the process of homeostasis and temperature control are central to hypothalamus.
- The ambient temperature is the average air temperature surrounding something (such as a person) whether inside or outside. In relation to weather, the ambient temperature is the same as the current air temperature at any one location. Exhaustive exercise in a hot environment can impair performance.
- Litter refers to any kind of trash thrown in small amounts, especially in places where it doesn't belong. It portrays a bad picture of an area.
- Serious problems of littering: causes physical harm or injury to people, facilitates the spread of disease, pollutes the environment, incurs high clean-up costs, affects and may kill wildlife, affects aesthetic value and local tourism, increases probability of fires, becomes breeding ground for insects, causes soil pollution and leads to air pollution.
- Humidity, water vapour in the air, plays an important role in controlling the temperature of a place. Without water vapour in the air, our climate might be like the climate on Mars. Too much or too little humidity can be dangerous.
- It affects human beings, animals, and plants. The human body depends on perspiration to get rid of excessive heat. During high humidity, evaporation of sweat from the body is reduced.
- Decreased sun exposure is associated with a drop in the serotonin (happy hormone) levels, which can lead to major depression with seasonal pattern.
- The cause of the air movement are the differences in air pressure within the atmosphere. Air moves from high pressure areas to low pressure areas. Speed of the wind also depends upon this difference of pressure.
- Water is a very powerful medicine. Many refer to it as the blood of the holy sacred mother, Mother Earth. This can make a flower beautiful, make a tree grow tall, make each and every person spiritual, holy, sacred.
- Increased positive ion levels in the air is linked with the condition called ion poisoning. It could lead to increased stress response in human bodies and increased serotonin. On the other hand, increased negative ion levels have been linked to be useful for humans in the sense that it leads to decreased stress levels, irritability, increased relaxation and decreased tiredness.

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- Reaction to everyday stressors can be significantly hindered by atmospheric stressors since they compromise the effectiveness of the immune system resulting in declining health and level of happiness among people.
- Increased amount of exposure to air pollution and various other environmental stressors present in the atmosphere can deteriorate health. Some people may not even be aware of such stressor, but their immune systems and other body systems are trying to save them from the attack of these stressors.
- The matters of adaptation, dysfunction and disease can be understood using the concept of psychological stressors. The term 'psychological stressors' is used refer to the social and physical aspects of the environment which exceed the availability of resources and adaptive capacity of an organism.
- Anderson defines noise sensitivity as a 'general measure of attitudes toward noise'. Research have shown that more than noise, noise sensitivity is more closely related to detrimental effects on one's physical and mental health.'
- The Environment Protection Act of 1986 defines noise as an environmental pollution and requires the Central government to make rules prescribing the maximum permissible limit of noise in different areas.
- Noise and noise sensitivity have negative effects on mental health and are associated with serious health risks such as heart attacks, strokes and hypertension. Exposure to noise is also seen to reduce learning and increase anxiety in children and adolescents.
- Noise is considered as public nuisance under Section 268 of the Indian Penal Code and a criminal liability could be put on a person who causes annoyance to people in general.

13.7 KEY WORDS

- **Physical stress:** It is identified as the environmental and physical changes responsible for alterations in the homeostasis of the body.
- **Ambient temperature:** It is the average air temperature surrounding something (such as a person) whether inside or outside.
- **Litter:** It refers to any kind of trash thrown in small amounts, especially in places where it doesn't belong.
- **Psychological stressors:** It is used refer to the social and physical aspects of the environment which exceed the availability of resources and adaptive capacity of an organizm.
- **Noise:** It is an unwanted sound that may adversely affect the health and well-being of an individual.

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13.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. List examples of physical stressors-the tangible and measurable stressors.
2. What is positive and negative physical stress?
3. Write a short note on the psychophysiology of physical stress.
4. What are the physiological adjustments induced due to physical activities?
5. Briefly explain humidity as a physical stressor and the ways of measuring humidity.
6. What are the factors responsible for noise pollution?
7. Write short note on the effects of noise and noise sensitivity.

Long-Answer Questions

1. Discuss the causes, problems, consequences and solutions to littering.
2. Explain the effect of wind, sunlight, air as physical stressors in the environment.
3. Describe the atmospheric environment stressors and their effects.
4. Discuss the laws which regulate noise in India and the problems with these laws.

13.9 FURTHER READINGS

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UNIT 14 RESEARCH METHODS IN ENVIRONMENTAL PSYCHOLOGY

Structure

14.0 INTRODUCTION

Environmental psychology is a problem-oriented field concerned with the interrelations among the physical settings, human behaviour and their experiences. It is defined in terms of the complexity of the events involved, the historical nature of space in relation to human behaviour, and the cultural, social, and organizational definitions of physical settings. In this unit, you will learn about the different methods of research used in environmental psychology and their adequacy in shedding light on the important issues in the field.

14.1 OBJECTIVES

After going through this unit, you will be able to:

- Discuss the different methods used in environmental psychology
- Explain the considerations needed for ensuring the adequacy of different research methods

14.2 OVERVIEW OF RESEARCH METHODS IN ENVIRONMENTAL PSYCHOLOGY

The main research methods used in environmental research include questionnaire studies, laboratory experiments, simulation studies, field studies and case studies.

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Let us discuss the different methods briefly here.

1. Observational Methods

Observation is defined as *receiving information through one of the five human senses*. Observational research methods are used for the study of humans and the physical environment. There are many ways in which we observe such as using a recycling bin is a form of observation. We get information in many forms, by watching/ listening/smelling, but the ability to record information around us through our senses can be enhanced with a variety of tools.

Indirect observation, is another effective and important tool for the study of environmental behaviour, it involves methods such as personal diaries, informants, or tracing measures. For example, the Rochester Interaction Record (Wheeler & Nezlek, 1977), and Social Behaviour Inventory (Moskowitz, 1994), standardized event contingent reporting methods (diary methods) are reliable and valid.

Direct observation is more immediate and objective than self reports.

General and Specific Methods for Observation

According to Gabriel, casual, passive and active are three basic approaches of direct observation. The sequence of the same are:-

Casual:

- Unsystematic and unconstrained
- Purpose: to get a preliminary idea of what is happening and generally not to publish
- Requires: an open mind

Passive:

- Also called naturalistic method
- Systematic: requires multiple observers and a clear procedure
- Purpose: to observe patterns of behaviour
- No interference (usually just watching)

Active:

- Like passive observation, but includes some manipulation of an independent variable
- Purpose: to establish some degree of causality

Let's discuss some of the techniques of observation:

(a) Paper and pencil method

This is simplest and most fool proof method for recording observed data. Researchers carefully watch an area or population of interest. They jot down their

observation/findings on a paper using either codes (for efficiency) or extensive notes (for detail). This method is cost effective, easy to transport, discreet, unlikely to malfunction, and does not require batteries or some other power source.

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(b) Behavioural mapping

Behavioural mapping is a technique used for recording people's behaviours and movements systematically as these behaviours occur in particular locations. It is an important tool for environment–behaviour research and is still largely conducted with a paper and pencil approach. "Shorthand" (specific to research/study) is used to note the behavioural mapping, proxemics (study of body postures) and kinesics (study of small body movements). This type of research suffers from certain limitations like:

- During a research, if the activity in question is illegal or against the social norm, people (due to social desirability), may not provide honest answers to questions about what they do in their daily lives, or where and how they carry out certain activities.
- People in question may not remember accurately whether they have done something or not, or how often they have done something, particularly regarding routine activities.
- People may not be consciously aware of their own behaviours.

(c) The Electronically Activated Recorder (EAR)

The Electronically Activated Recorder (EAR) is a device used to study people in their natural environments. It is a small recording device attached to volunteers' clothes that turn on, at fixed/random intervals all through the day.

(d) Coding

Coding makes observational studies systematic, replicable and scientific. It involves categorizing what is observed. This can occur as part of data collection (i.e., on site) or later, from a record or transcript.

Observing by Watching: Final Thoughts

Laboratory and field observations are used with a variety of experimental or quasi experimental designs. These methods can also provide some evidence of causality. Observation is a very effective and is based on the founding principles of the scientific tool for studying interaction of humans with environment. Through casual, passive and active observation, a researcher can build convincing cases for real world phenomena in such a way that surveys and other indirect measures do not permit.

2. Questionnaire studies

Questionnaire studies provide a description of people's behaviours and also help in gathering perceptions, attitudes and beliefs about various issues. Environmental

psychology holds a special significance for this method due to various reasons. Firstly, manipulation of environmental conditions and random assignment of participants are often impossible or considered to be unethical. For instance, while conducting a research on the effects of transport pricing on car use, it is not quite possible to double fuel prices in one area, but not in another comparable area. Secondly, questionnaires are widely used in order to help establish correlation between two or more variables. For example, a relationship can be established between amount of littering done by people and their level of satisfaction with the number of dustbins in the neighbourhood by using this method.

3. Laboratory experiments

Experiments that are conducted in a controlled, mostly artificial, environment which is created for research purposes are known as laboratory experiments. The cause-effect relationship between the variables is enabled due to manipulation and random assignment.

4. Computer simulation studies

Researchers conducted with real individuals or realistic environmental stimuli are commonly called as Computer simulation studies. Examples include researches that focus on learning about complex systems involving several people or studies focusing on people's evaluation on the futuristic environmental perspective. Environmental psychologists facilitate simulations for the environment in these studies. Simulated aspects of environments and/or humans are included in these experiments. A realistic experience is provided to the participants with regard to certain environments or events.

5. Field studies

In order to achieve a higher external validity without compromising on the internal validity, the method of field study is used by environmental psychologists. External validity, in case of field studies is higher since they are conducted in naturalistic environments. Internal validity is high as the experimenter aims to control the situation by the systematic manipulation of the independent variable (e.g. placing or removing a bin next to a park bench), and tries to assign participants to various conditions of the study.

Case studies

The in-depth analysis of a specific situation is known as case study, which is different from a general statistical analysis. In order to narrow down a broad research topic into a single case, the method of case study is applied. For instance, the method of case study can be applied in order to study the broad topic of urban environmental quality in one particular neighbourhood where garbage bins have recently been installed by the municipality.

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14.2.1 Evaluating the Adequacy of Environmental Research

A research environment refers to an environment that facilitates integrity and is based on good governance, promotes best research practices and provides the right needed support of the development of researchers and for a good research to take place. It includes the following:

- Clear policies, practices, procedures to support researchers
- Suitable learning, training, mentoring opportunities to support researchers
- An effective management system that ensures policies relating to research, so that right behaviour are implemented
- Greater awareness amongst researchers of the optimum standards and behaviours with respect to research that are expected of them.
- Systems that identify potential concerns at an early stage and mechanisms for providing support.

Environmental research is important as environment studies is all about learning the way we should live and how we can develop sustainable strategies to protect the environment. It helps one gain a better understanding of living and the physical environment so that one can resolve challenging environmental issues that affect our nature.

Effectiveness of a research environment is assessed in terms of its 'vitality' and 'sustainability'.

An effective research environment is one which supports the behaviours and practices that are expected in world-leading research environments, and support world-leading research of the highest quality. Such an environment possesses some of the following key features:

- It promotes a culture of excellence in terms of expectations and commitment towards work and further development of knowledge.
- It provides ample opportunities to discuss and develop research ideas.
- It encourages people to take initiative, collaborate with one another and engage in meaningful work.
- It creates an environment that is both externally competitive but internally cooperative.
- It promotes a sense of mutual respect and mutual support.
- It should provide reliable information so the right decision and recommendations can be made
- One of its key goal is foster sustainable environmental and economic systems by
  - o Protecting resources so that they will not be damaged and become unavailable for use
  - o By *restoration* of resources that have been mismanaged and damaged and

- o By taking responsibility for *management* of resources, including natural, economic, cultural, and human resources.

To achieve this goal, environmental research must take the following three steps:

- o Collect and analyse information needed in and outside government to pursue the goals
- o Improve knowledge of the fundamental processes and of various factors that shape and affect the natural world and the human behavior and the reciprocal relationship the two share
- o Apply the knowledge to solve environmental problems with a comprehensive management strategy keeping in mind economic and social needs

- It should eventually enable one to develop effective policies based on a sound information. These policies should further enable us to protect, restore and manage our environmental resources effectively.

Forming Linkages between Science and Decisions at Different Levels

However, the current state of affairs in this area are not very encouraging as the presently we do not have enough environmental data and information that could be used to make effective decisions especially when it comes to larger issues at hand. Thus, a lot needs to be done to form effective linkages between science and decisions at various levels.

- A lot of effective research, work and effort is required to ensure that the best scientific information is translated into strong and defensible policies for protection, restoration, and management.
- There is a need to establish an *Environmental Assessment Center* in which large environmental issues that cross agency mission boundaries can be assessed, and policy options developed.
- There is a need to make some key fundamental changes in how environmental research is conducted and used within the federal research enterprise. For instance, our understanding and factual knowledge about our environment and about the interactions among different components, need to be enhanced if we wish to solve urgent environmental problems.
- One must engage more in multi-scale and multidisciplinary research to further enhance our knowledge and understanding of various environmental issues and concerns.
- Both the public and private sectors can collaborate in research to provide valuable contributions of state environmental organizations and nongovernment organizations.
- Research should be of high quality and yet economical in nature with a stable funding base. It should be pluralistic in approach and be supported by multiple funding strategies with proper regard for balance between intramural and peer-reviewed extramural support.

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- For environmental research to be able to effectively solve and contribute to international competitiveness and economic strength, it must provide for the support and training of the next generation of scientists and should also provide for appropriate development of instrumentation and facilities for research in this regard.
- There is a need for disciplinary balance, where equal importance needs to be given to both physical and social sciences. Until we understand human actions and interactions sufficiently to guarantee the success of environmental protection and restoration measures, we will not know how to design these measures. in addition, the overwhelmingly complex problems of designing sustainable economic-development policies need to be solved before humans can enjoy a better standard of living without destroying and harming the environment around.
- There is a strong need for all relevant environmental disciplines to be supported and that additional emphasis be placed on the biological and social sciences and on engineering.
- There is a need to promote multidisciplinary research as a more complete understanding of our environmental processes will depend on examining the key interactions between our biological, physical and social events.

Although we have come a far way from where we started, but when it comes to environmental psychology a lot still needs to be done.

Check Your Progress

1. What are the different types of behavioural mapping techniques?
2. How is external and internal validity higher in field studies?
3. What are the terms on which the effectiveness of a research environment is assessed?

14.3 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. “Shorthand” (specific to research/study) is used to note the behavioural mapping, proxemics (study of body postures) and kinesics (study of small body movements).
2. External validity, in case of field studies is higher since they are conducted in naturalistic environments. Internal validity is high as the experimenter aims to control the situation by the systematic manipulation of the independent variable (e.g. placing or removing a bin next to a park bench), and tries to assign participants to various conditions of the study.
3. Effectiveness of a research environment is assessed in terms of its ‘vitality’ and ‘sustainability’.

NOTES

14.4 SUMMARY

- Environmental psychology is a problem-oriented field concerned with the interrelations among the physical settings, human behaviour and their experiences.
- Main research methods used in environmental research include questionnaire studies, laboratory experiments, simulation studies, field studies and case studies.
- Observational research methods are used for the study of humans and the physical environment.
- *Indirect observation*, is another effective and important tool for the study of environmental behaviour, it involves methods such as personal diaries, informants, or trace measures.
- According to *Gabriel*, casual, passive and active are three basic approaches of direct observation.
- Questionnaire studies provide a description of people's behaviours and also help in gathering perceptions, attitudes and beliefs about various issues.
- Experiments that are conducted in a controlled, mostly artificial, environment which is created for research purposes are known as laboratory experiments. The cause-effect relationship between the variables is enabled due to manipulation and random assignment.
- Researchers conducted with real individuals or realistic environmental stimuli are commonly called as Computer simulation studies. Examples include researches that focus on learning about complex systems involving several people or studies focusing on people's evaluation on the futuristic environmental perspective.
- In order to achieve a higher external validity without compromising on the internal validity, the method of field study is used by environmental psychologists.
- The in-depth analysis of a specific situation is known as case study, which is different from a general statistical analysis. In order to narrow down a broad research topic into a single case, the method of case study is applied.
- A research environment refers to an environment that facilitates integrity and is based on good governance, promotes best research practices and provides the right needed support of the development of researchers and for a good research to take place.
- Effectiveness of a research environment is assessed in terms of its 'vitality' and 'sustainability'. An effective research environment is one which supports the behaviours and practices that are expected in world-leading research environments, and support world-leading research of the highest quality.
- However, the current state of affairs in this area are not very encouraging as the presently we do not have enough environmental data and information that could be used to make effective decisions especially when it comes to larger issues at hand. Thus, a lot needs to be done to form effective linkages between science and decisions at various levels.

NOTES

14.5 KEY WORDS

- **Observation:** It is defined as receiving information through one of the five human senses for the study of humans and the physical environment.
- **Behavioural mapping:** It is a technique used for recording people's behaviours and movements systematically as these behaviours occur in particular locations.
- **Laboratory experiments:** It refers to the experiments that are conducted in a controlled, mostly artificial, environment which is created for research purposes.
- **Computer simulation studies:** It refers to the researchers conducted with real individuals or realistic environmental stimuli.

14.6 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the different approaches of direct observation?
2. List the limitations of behavioural mapping as a method.
3. Why are questionnaire studies considered a significant method in environment psychology?
4. What are the qualities a good research environment must have?

Long-Answer Questions

1. Explain the main research methods used in environmental research.
2. Discuss how effective linkages should be formed between science and decision making at different levels.

14.7 FURTHER READINGS

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